STATE OF SOUTH CAROLINA

HAZARDS ASSESSMENT

2008

South Carolina Emergency Management Division
Office of the Adjutant General

Update Prepared By the
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EXECUTIVE SUMMARY

South Carolina is a diverse state in terms of its geography, population, and exposure to hazards. The amount of hazard risk and exposure varies across the state as does the social vulnerability. Thus the impacts of hazard events, such as hurricane, may affect some portions of the state and its residents more than others. Successful hazard response and mitigation planning requires leaders to understand these differences and to account for the variability in hazards and vulnerability in relation to current plans, policies, and laws. Empirically-based hazard planning and mitigation enables the state to balance fiscal growth and risk reduction with minimal adverse impact to lives and livelihoods.

The purpose of this assessment is to provide a detailed summary of the three aspects of hazard impacts for the state:

1. Social vulnerability – the underlying characteristics of the population that either attenuate or exacerbate the effects of hazard events;
2. Hazard vulnerability – the historical hazard frequency of occurrence (risk) for 24 different hazard types that indicates which places have been more frequently impacted by hazard events;
3. Place vulnerability – the combination of social vulnerability and hazard vulnerability to identify those places that are both historically more at risk and have a predisposition for adverse impacts/affects from hazard events

Social Vulnerability Assessment

Much attention has been given to the idea of social vulnerability in recent years. Since hurricane Katrina, the spotlight has been focused directly on those persons who are (for one reason or another) unable to adequately prepare for, respond to, cope with, rebound from, and adapt to hazard events. The Social Vulnerability Index (SoVI), first implemented at the county level for the entire United States, provides a peer reviewed methodology for creating a standardized comparative metric aimed at understanding differences in socio-economic and demographic information between places (Cutter et al. 2003). This report implements the SoVI metric at both the county and tract levels for the entire state so that planners and emergency managers can 1) quickly identify broad differences across the state, and 2) begin to understand (at sub-county levels) the characteristics of their populations and how these are increasing or decreasing vulnerability.

Social vulnerability maps at county and sub county level geographies for the state can be seen in figure E1. Four county level clusters of elevated social vulnerability within the state are evident in the top map in figure E1. These are: 1) Low Country, including Allendale, Beaufort, Hampton, and Jasper Counties; 2) portions of the Pee Dee region, encompassing Dillon and Marlboro Counties; 3) Western Midlands, including Fairfield, Newberry, Saluda and McCormick Counties, and 4) Southern Midlands including Calhoun, Clarendon, and Lee. All of the counties within the elevated SoVI classification have demographic characteristics that negatively influence their ability to prepare for and respond to hazards.

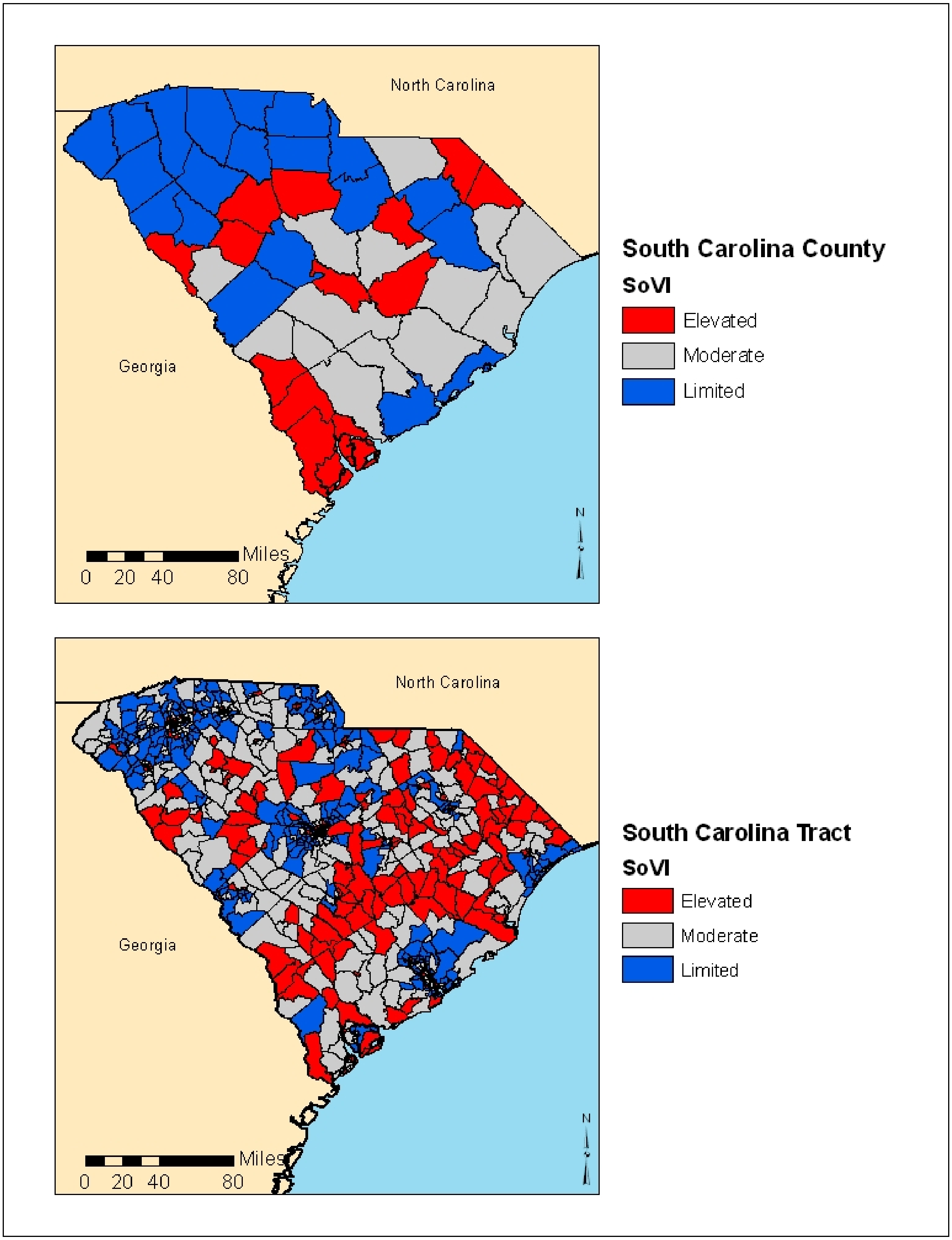

Figure E1: Social Vulnerability for South Carolina Counties and Census Tracts

Tables E1 and E2 provide a snapshot of the drivers for the top 10 most and least socially vulnerable counties (respectively). Notice that different drivers of vulnerability are present in each county. These drivers can provide insight into potential mitigation measures, planning practices, and program development foci for different counties.

Table E1: Top ten most socially vulnerable counties, scores, and drivers

County	Social Vulnerability Score	Main Drivers of increasing social vulnerability	Main drivers decreasing social vulnerability
Saluda	7.315	Urbanization and lack of wealth, migrants and ethnicity, and rural special needs	Race, gender, and employment
Dillon	5.769	Race, gender, and unemployment, age, and race and ethnicity - Native Americans	Employment
Marlboro	4.797	Race and ethnicity - Native Americans	Migrants and ethnicity
Lee	4.678	Race, gender, and unemployment, migrants and ethnicity, and rural special needs	Race and ethnicity - Native Americans
McCormick	4.585	Age, unemployment, and rural special needs	Migrants and ethnicity
Jasper	4.565	Urbanization and lack of wealth, age, unemployment, and migrants and ethnicity	Rural special needs
Allendale	3.954	Race, gender, and unemployment	Rural special needs
Clarendon	3.118	Urbanization and lack of wealth and age	None
Hampton	2.939	Urbanization and lack of wealth and age	Rural special needs
Beaufort	2.764	Age, employment, and migrants and ethnicity	Urbanization and wealth and rural special needs

Table E2: Top ten least socially vulnerable counties, scores, and drivers

County	Social Vulnerability Score	Main Drivers of increasing social vulnerability	Main drivers decreasing social vulnerability
Union	-2.37	Unemployment	Race, gender, and unemployment, migrants and ethnicity, and rural special needs
Anderson	-2.3	Unemployment	Race, gender, and unemployment
Oconee	-2.27	Age	Race, gender, and unemployment and rural special needs
Spartanburg	-2.179	None	Urbanization and wealth and race, gender, and unemployment
Pickens	-2.082	Age	race, gender, and unemployment and rural special needs
Lexington	-2.081	Age	Urbanization and wealth and race, gender, and unemployment
Kershaw	-2.036	None	race, gender, and unemployment
Cherokee	-1.769	Urbanization and wealth	race, gender, and unemployment, and rural special needs
Lancaster	-1.657	None	Race, gender, and unemployment, and rural special needs
Greenville	-1.646	Migrants and ethnicity	Urbanization and wealth and race, gender, and unemployment

While the county level SoVI provides a broad overview of the relative levels of social vulnerability for the counties, it is clear that even within counties there is considerable variability in the social vulnerability of residents. To describe such variation, a sub-county social vulnerability score was also computed for each census tract within the state (Figure E1 – bottom map). From this perspective, one can see how the social vulnerability is concentrated in some of the most rural and economically-depressed regions of the state stretching along the I-95 corridor and throughout the Pee Dee region. The census tract view of SoVI provides useful information for individual counties in determining where their resources might be most effectively utilized to enhance preparedness, response, and recovery. Appendix II provides county specific SoVI maps by census tract as part of the county vignettes.

Hazard Vulnerability

South Carolina's diverse landscape gives rise to numerous hazard events. Not only is the state susceptible to coastal hazards such as hurricanes and tropical storms, it is also subject to meteorological hazards (flooding, thunderstorms, hail events), geophysical hazards (earthquakes, landslides), and wildfires among others. This assessment identifies the principal hazards threatening the state and its communities. Each South Carolina county and municipality has a unique combination of natural, technological, and societal hazards that could harm specific areas or damage important community assets or functions. Because this assessment was generated for use at the state level, hazards listed in the *South Carolina Emergency Operations Plan 2009*

(EOP) are included, along with NCDC Storm Data Report hazards. Listed below are the hazards included in this assessment.

Twenty-four specific hazard types are included in this assessment and are broken into numerous broad categories consistent with the state risk assessment:

- Coastal Events, including Hurricanes/Tropical Storms, Ocean & Lake Surf, and Waterspout
- Dam Failure
- Drought
- Flood
- Fog
- Geophysical Events, including Avalanche, Earthquake, and Landslide
- Human-Induced Hazard Events, including Civil Disturbance, Hazardous Materials (HAZMAT), Nuclear Power Plants, Terrorism, and Transportation (Motor Vehicle)
- Severe Thunderstorm Events, including Funnel Cloud, Hail, Heavy Precipitation, Lightning, Thunderstorm Wind, and Tornado
- Temperature Extreme
- Wildfire
- Winter Weather (Snow & Ice)

While these hazards are not inclusive of every possible hazard type for South Carolina, they do include those events most likely to cause adverse impacts to people and property. Historical hazard frequency of occurrence rates (risk potential) were calculated for these events and combined into an overall hazard frequency value for each county. Table E3 is displays the overall hazard frequencies and recurrence intervals for each hazard in the assessment. While the recurrence intervals give planners an idea of how much time to expect between events within a specific category, the hazard frequency provides the percent chance per year (risk) of a singular event occurring in the state.

Total all-hazard scores for each county were calculated using the overall hazard frequencies combination. These scores provide a quick glimpse into the hazardousness of each county (Table E4). This table provides a breakdown of main influences on county hazard scores for the top 10 most hazardous counties. This table includes any hazard that had a score of at least 0.75 in an individual county. Note that while Charleston has ten (10) hazards which drive up its total hazard score, some counties with high scores only have two (2) or three (3) hazards influencing their high score. Cases such as Horry, Laurens, Anderson, Beaufort, Colleton, and Oconee in which high hazard scores are being driven by a relatively low number of hazards indicate that lives and livelihoods in this state can have a high overall threat level without having high incidents (historically) for every hazard event type in this study.

<u>Place Vulnerability</u>

Place Vulnerability for a county was determined by adding its Total Hazard Score (hereafter referred to as Hazard Occurrence score), and the Total Social (Vulnerability) Score. Choropleth maps for each score category (Hazard Frequency of Occurrence, Social

Vulnerability, and Place Vulnerability) are provided to give spatial representation of scores. These maps were created using standard deviations, where greater than .5 standard deviation equals elevated; .5 to -.5 equals moderate; and less than -.5 equals limited. Results for each hazard category are explained, followed by a final hazard assessment. Any significant events that occurred during the update period (2006-2008) are noted. The analyses are presented by hazard in the order they appear in the state EOP.

Charleston has the highest total of place vulnerability, followed by Berkeley, Beaufort, and Saluda (Table E5). In the case of Charleston, the ranking is largely based on the hazard frequency. The same is true for Greenville. In the case of Saluda County, the hazard score is low, but the County has the highest level of social vulnerability in the state, which contributes to the overall ranking. For Berkeley and Beaufort it is a combination of the hazards occurrence and the social vulnerability that contribute to the overall place vulnerability.

Table E3: South Carolina Hazard Frequencies

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	85	158	1.86	53.79
Ocean & Lake Surf[b]	32	16	0.50	200.00**
Waterspout	33	16	<0.50	206.25**
Dam Failure	-	-	-	-
Drought	64	59	0.92	108.47**
Flood	706	59	<0.50	1,196.61**
Fog	9	12	1.33	75.00
Geophysical Events				
Avalanche	1	49	49.00	2.04
Earthquake	1,543	310	<0.50	497.74**
Landslide	1	49	49.00	2.04
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (HAZMAT)	9,535	22	<0.50	43,340.91**
Nuclear Power Plant	1	8	8.00	12.50
Terrorism	2	38	19.00	5.26
Transportation (Motor Vehicle)	974,302	10	<0.50	9,743,020.00**
Severe Thunderstorm Events				
Funnel Cloud	54	16	<0.50	337.50**
Hail	3,894	59	<0.50	6,600.00**
Heavy Precipitation	119	15	<0.50	793.33**
Lightning	370	16	<0.50	2,312.50**
Thunderstorm Wind	7,024	59	<0.50	11,905.08**
Tornado	900	59	<0.50	1,525.42**
Temperature Extremes	54	16	<0.50	337.50**
Wildfire	92,286	21	<0.50	439,457.14**
Winter Weather (Snow & Ice)	155	59	<0.50	262.71**

[a] Data Sources: National Climatic Data Center (**www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm**); National Geophysical Data Center (**www.ngdc.noaa.gov/hazard/**)
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

Table E4: Top ten most hazardous counties, scores, and drivers*

County	Total All-Hazard Score	Main Drivers of Hazard Score
Charleston	10.128	Hurricane/Tropical Storm, Ocean & Lake Surf, Waterspout, Flood, HAZMAT, Transportation, Funnel, Hail, Tornado, and Extreme Temperature
Greenville	9.576	Flood, Fog, Terrorism, Transportation, Hail, Thunderstorm Wind, Extreme Temperature, and Winter Weather
Spartanburg	8.596	Funnel, Hail, Lightning, Thunderstorm Wind, and Extreme Temperature
Berkeley	7.480	Hurricane/Tropical Storm, Earthquake, Hail, Extreme Temperature, and Wildfire
Horry	7.131	Ocean & Lake Surf and Lightning
Anderson	6.713	Thunderstorm Wind and Extreme Temperature
Laurens	6.238	Avalanche and Heavy Precipitation
Beaufort	5.896	Hurricane/Tropical Storm, Lightning, and Extreme Temperature
Colleton	5.395	Hurricane/Tropical Storm and Extreme Temperature
Oconee	5.360	Fog and Winter Weather

*Score does not include transportation incidents

Table E5: Place Vulnerability Scores

Rank	County	Standardized Hazard Score*	Standardized SoVI Score	All-Hazards Total Place Vulnerability
1	Charleston	1.000	0.11	1.114
2	Berkeley	0.724	0.43	1.152
3	Beaufort	0.559	0.53	1.089
4	Saluda	0.019	1.00	1.019
5	Greenville	0.942	0.07	1.017
6	Jasper	0.280	0.72	0.996
7	Horry	0.687	0.29	0.977
8	Dillon	0.063	0.84	0.903
9	Spartanburg	0.840	0.02	0.860
10	Marlboro	0.117	0.74	0.857
11	Colleton	0.506	0.29	0.792
12	Allendale	0.133	0.65	0.786
13	Orangeburg	0.418	0.36	0.780
14	Lee	0.043	0.73	0.770
15	Clarendon	0.199	0.57	0.766
16	Richland	0.473	0.29	0.762
17	Laurens	0.594	0.15	0.740
18	Georgetown	0.375	0.36	0.738
19	McCormick	0.013	0.72	0.732
20	Hampton	0.168	0.55	0.716
21	Fairfield	0.191	0.46	0.656
22	Anderson	0.644	0.01	0.651
23	Dorchester	0.412	0.24	0.649
24	Newberry	0.119	0.53	0.647
25	York	0.408	0.19	0.600
26	Chesterfield	0.135	0.45	0.581
27	Calhoun	0.060	0.52	0.577
28	Pickens	0.502	0.03	0.531
29	Barnwell	0.173	0.35	0.526
30	Oconee	0.503	0.01	0.513
31	Sumter	0.151	0.34	0.489
32	Florence	0.337	0.15	0.486
33	Chester	0.380	0.10	0.485
34	Bamberg	0.074	0.39	0.464
35	Williamsburg	0.205	0.26	0.462
36	Cherokee	0.399	0.06	0.461
37	Edgefield	0.000	0.42	0.416
38	Greenwood	0.328	0.08	0.412
39	Abbeville	0.267	0.14	0.403
40	Darlington	0.190	0.19	0.375
41	Lexington	0.344	0.03	0.374
42	Aiken	0.264	0.10	0.367
43	Marion	0.084	0.25	0.330
44	Union	0.263	0.00	0.263
45	Kershaw	0.177	0.03	0.212
46	Lancaster	0.097	0.07	0.171

*This does not include transportation incidents.

When depicting these relationships in visually (Figure E2), a number of interesting patterns emerge. First, the hazard occurrence shows two primary clusters of elevated levels (top map): one for coastal counties (except Georgetown) and the other for counties in the Upstate. When combined with social vulnerability, one county stands out in terms of elevated hazards and elevated social vulnerability: Beaufort (Figure E2 bottom). It is in this county that priority for planning and mitigation should be focused. The second priority for planning and mitigation would be for those counties shaded in dark blue or red. Counties shaded in dark blue have elevated levels of hazard, but only moderate levels of social vulnerability. These include Horry, Berkeley, Colleton, and Richland. Counties shaded in red have a moderate hazard level with an elevated social vulnerability. Jasper County falls into this category. The third priority for planning and mitigation would those counties that are in the elevated hazard category, but have limited social vulnerability (shaded in medium blue). These counties include Charleston, and most of the Upstate Counties.

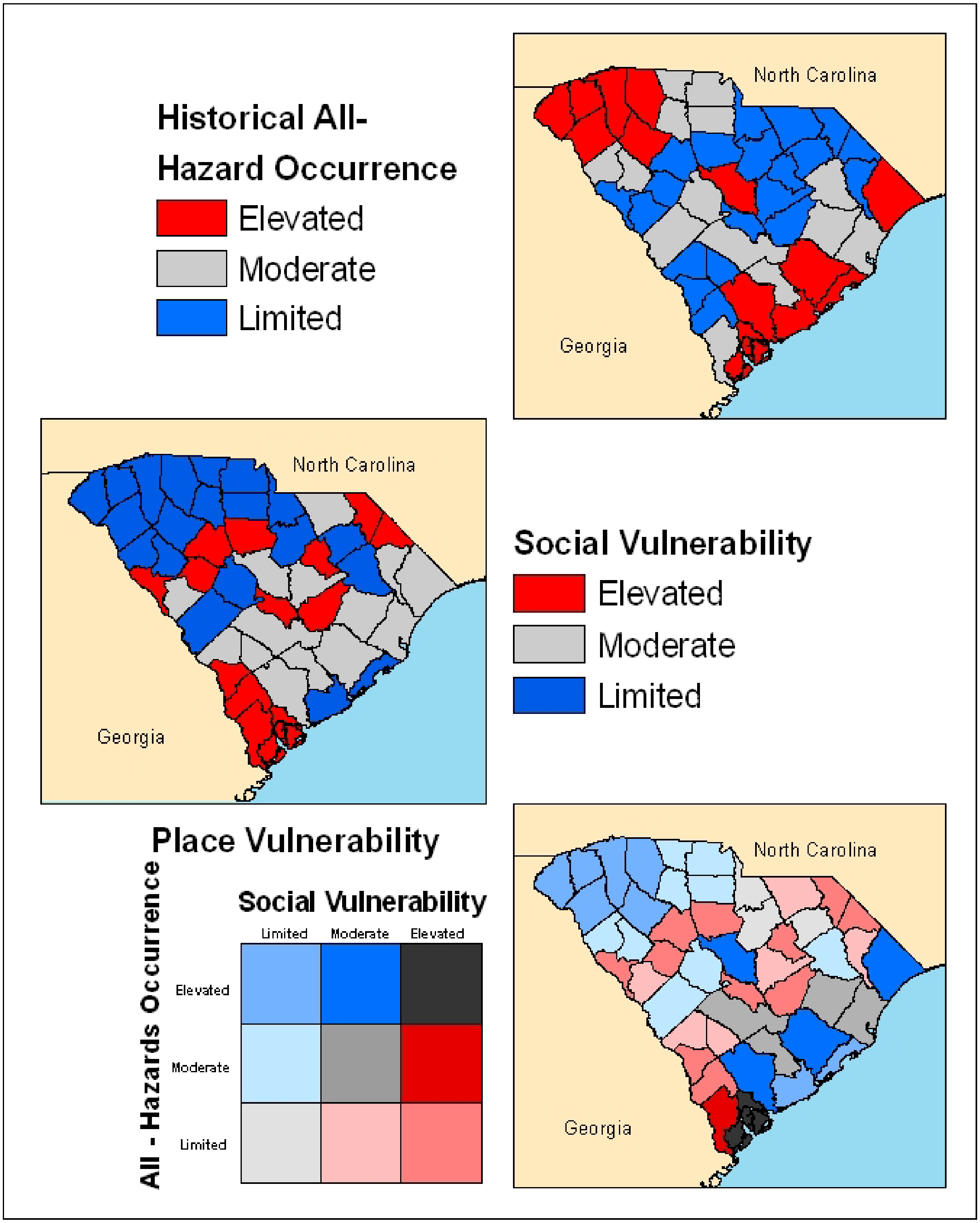

Figure E2: Hazard Frequency, Social Vulnerability, and Place Vulnerability Scores for All Hazards

1 INTRODUCTION

The complex topography of South Carolina ranging from mountainous regions to coastal plains to barrier islands creates different types of natural hazards associated with these regions. South Carolina also has a diverse industrial base that includes all sectors from light manufacturing facilities to power generation including nuclear power plants. Both natural (e.g. hurricanes, tornadoes, lightning) and technological hazards (e.g. hazardous material spills, dam failures, or structure fires) threaten the entire state. Some hazards like tornadoes have a quick onset, which offer little opportunity for warning, while others take months to develop and are often difficult to mitigate such as drought or climate change. All of these hazards, however, have the potential to disrupt day-to-day activities, cause extensive property damage, and create significant casualties. The State's diverse topography coupled with its industrial base and the distribution of population set the stage for assessing the hazardscape for the state. Understanding the potential exposure and risk to people and property from hazards is the first step towards the initiation of mitigation strategies that ultimately will reduce the impacts of these hazards on the state and its residents.

2 PURPOSE AND SCOPE

2.1 Planning

This document provides an all-hazards assessment for the state of South Carolina. Since there continues to be no FEMA-prescribed national methodology, this document adapts the University of South Carolina's Hazards and Vulnerability Research Institute's, Handbook for Conducting a GIS-Based Hazards Assessment at the County Level (1997). This methodology can be used by counties as they develop their All-Hazard Assessment. Loss data utilized within this report (see Appendix II) enable a closer examination and ranking of hazards in order of their specific impacts. These loss data include information on property and crop loss (damage), injury, and death for eighteen different hazard categories and allow for more detailed geographically based assessments of hazard impacts to our state.

The procedures for conducting the statewide assessment are presented in phases to simplify the work process leading to the final overview for the state (Figure 2.1). Procedures and results of the statewide assessment are presented first. This is followed by event-specific information for the state. County level hazard profiles are available in Appendix III.

It is important to note that hazards assessments are dynamic and require frequent review, update, and approval. The Statewide Hazards Assessment will be reviewed and revised tri-annually as new and more recent data become available. For example, the incorporation of recent hazard event data (from 2005 – 2008) improved the hazard frequency data. Also, information and spatial data for other hazards are added as information becomes available. Point locations of hail events, better measures of extreme heat and drought, and climate change related hazards such as sea-level rise are a few examples of the hazards we expect to add in future updates.

2.2 The All-Hazard Assessment Procedure

The All-Hazard Assessment Procedure is a version of the flow chart from the Handbook and is provided in Figure 2.1.

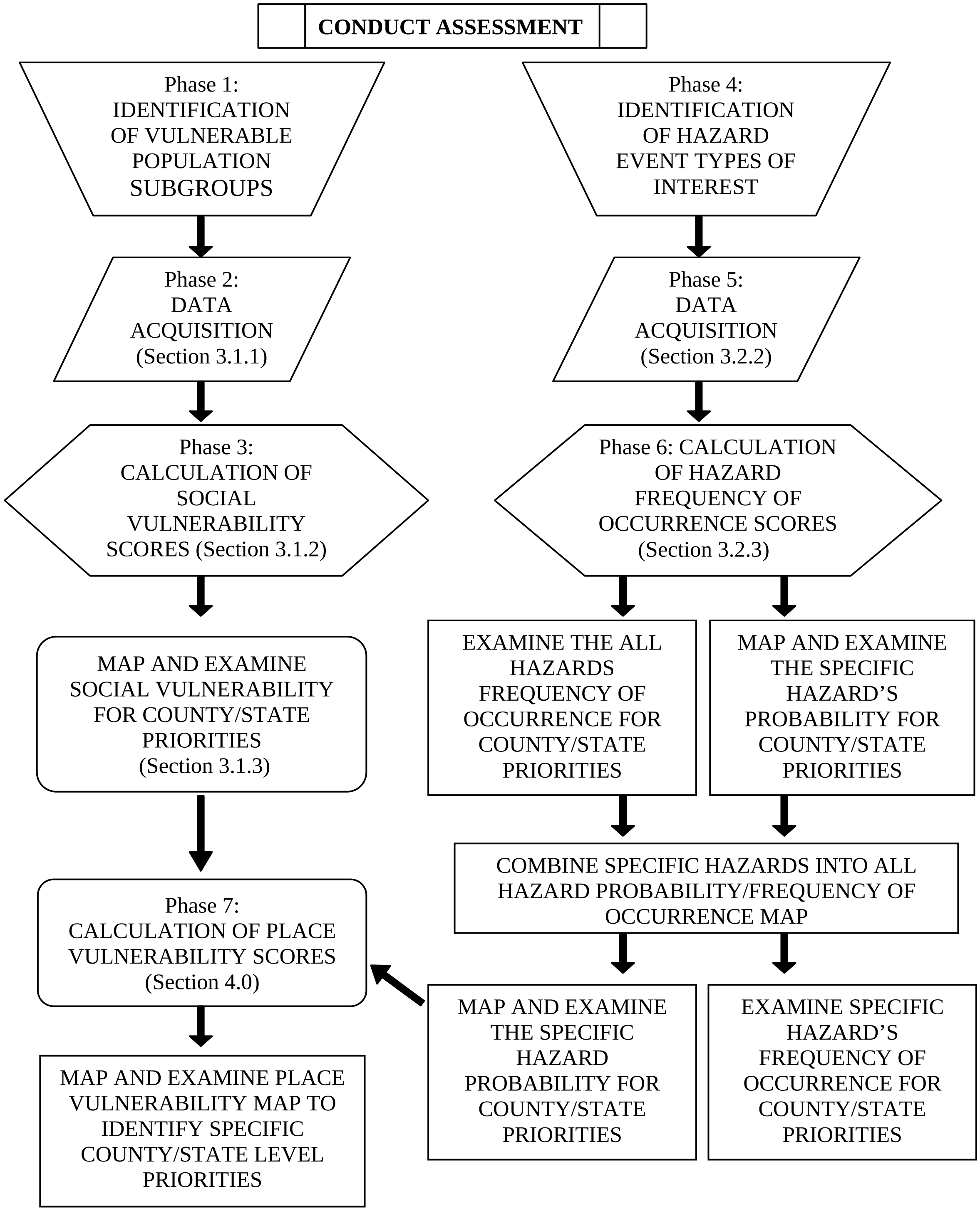

Figure 2.1: All Hazard Assessment Procedure Flow Chart

3 CONDUCT ASSESSMENT

The methods used in this assessment follow the flowchart on the previous page. The researchers first assessed the social vulnerability for each county in the state. The social vulnerability score provides a baseline understanding of the pre-existing socio-economic and demographic conditions of the population that may give rise to adverse impacts from disaster. Next, the hazard vulnerability for each county was calculated for every hazard (individually) and then combined into an overall hazard (biophysical) vulnerability score. Biophysical vulnerability scores provide a contextual understanding of the hazards that impact a certain place. These scores give planners an empirical base from which to devise mitigation plans aimed at minimizing hazard impacts. The biophysical vulnerability score was then combined with the social vulnerability score for each county to create an overall place vulnerability score. The place vulnerability score for each county is especially important because it provides an idea of where impacts will be greatest for each hazard/combination of hazards in relation to the social forces that are present at a place. This information gives planners a better idea of where to focus key resources aimed at minimizing or mitigating the effects of hazard events on the people and property of South Carolina.

3.1 Social Vulnerability

The Social Vulnerability Index (SoVI) is a quantitative measure of social vulnerability to environmental hazards. Originally developed in 2003 and applied to U.S. counties, SoVI provides a comparative metric that facilitates the geographic examination of differences in levels of social vulnerability across states and regions (Cutter et al. 2003). Based on extensive research literature focused on post-disaster response and recovery that now spans nearly a half century (National Research Council 2006), SoVI includes those population characteristics known to influence the ability of social groups and communities to prepare for, respond to, and recover from disasters, especially coastal disasters (Heinz Center 2002). The index synthesizes these socioeconomic variables into multiple dimensions, and sums the values to produce the overall score for the particular spatial unit (e.g. county, census tract) of interest. SoVI is widely used in state hazard assessments across the country.

3.1.1. Identification of Vulnerable Population Subgroups

Conceptually, SoVI relates well to indices of social well-being, but its focus is on environmental hazards and the capacity of social groups to prepare for, respond to, and recover from disasters (Table 3.1). For example, socioeconomic status (wealth or poverty) affects the ability of a community to absorb losses. While wealth enables communities to withstand the impact of losses more readily, those communities in poverty tend to suffer disproportionately because of their lack of access to capital, insurance and so forth. Age, normally recognized as the two extremes of the age continuum, is another characteristic that influences vulnerability. Generally, the very young (children) and the elderly need special care, are often more susceptible to harm, and may have mobility constraints, all of which influence the ability to get out of harm’s way. Special needs populations (nursing home residents, infirmed, homeless) are another example of a highly vulnerable population as they are often difficult to identify and require specific resources before, during, and after a disaster. Gender, race, and ethnicity often give rise to language and cultural barriers, influencing access to post-disaster recovery funding, and sometimes constrain employment opportunities and access to education. Finally, housing type and tenure (manufactured housing and renters) influence vulnerability. Manufactured housing is not reliable as a sheltering option in high wind environments, for example. Renters are more vulnerable than homeowners are because they live in temporary quarters, often do not have renters insurance to cover the loss of their personal property, and lack strong social ties to the community. SoVI reflects those characteristics of **social groups** that influence their differential capacity to prepare for and respond to environmental threats and is a useful indicator of the geographic variability in social vulnerability.

Table 3.1: Known Correlates of Social Vulnerability and Variables used to compute SoVI-SC *

Population Characteristic and Specific Variables	**Influence on Social Vulnerability**
Race & ethnicity % African American % Native American % Asian or Pacific Islander % Hispanic	Impose language and cultural barriers for disaster preparedness and response; affects access to pre and post-disaster resources; minority group tendency to occupy high hazard areas; Non-white and non-Anglo populations are viewed as more vulnerable.
Socioeconomic Status Per capita income % households earning more than $100,000 % poverty	Affects community ability to absorb losses; wealth enables communities to recover more quickly using insurance, personal resources; poverty makes communities less able to respond and recover quickly
Gender % females in labor force % female population	Women often have a more difficult time coping after disasters than men due to employment sector (personal services), lower wages, and family care responsibilities.
Age % population under 5 years old % population over 65 Median age	Age extremes (elderly and very young) increase vulnerability; parents must care for children when day care facilities are not available; elderly may have mobility or health problems
Rural/Urban % rural farm population % urban population	Rural residents may be more vulnerable due to lower wealth and dependence on locally-based resource economy (farming); high density urban areas complicate evacuations and sheltering
Renters % renters Mean dollar rent	Renters are viewed as transient populations with limited ties to the community; they often lack shelter options when lodging becomes uninhabitable after disasters or too costly; lack insurance, often lack savings
Residential property Mean value of owner occupied housing % housing units that are mobile homes # housing units per square mile	The value, quality, and density of residential construction affects disaster losses and recovery; expensive coastal homes are costly to replace; mobile homes are easily damaged
Occupation	Some occupations especially those involving resource extraction (fishing, farming) can be

% employed in farming, fishing, forestry % employed in service occupations % employed in transportation, communication, and other public utilities	affected by disasters; service sector jobs suffer as disposable income declines; infrastructure employment (transportation, communications, utilities) is subject to temporary disruptions post-disaster
Family Structure Average number of people per household % Female headed households, no spouse	Families with large numbers of dependents or single parent households may be more vulnerable because of the need to rely on paid care-givers
Employment % civilian labor force unemployed % population in civilian labor force	Communities with high numbers of unemployed workers (pre disaster) are viewed as more vulnerable, because jobs are already difficult to obtain; this slows the recovery post disaster
Education % population over 25 with no high school Diploma	Limited educational levels influence ability to understanding warning information, likely disaster impacts; access to post recovery resources
Population Growth % foreign born (1990-2000) residents	New immigrant populations lack language skills and are unfamiliar with state and federal bureaucracies in how to obtain disaster relief; may not be permanent or legal residents; unfamiliar with range of hazards in area
Access to Medical Services Health care workers per 100,000 population Per capita number of community hospitals	Health care providers are important sources of post-disaster relief and help speed recovery; lack of access to hospitals, physicians, and health care provides lengthens recovery
Social Dependency and Special Needs Populations % collecting social security benefits Per capita residents in nursing homes	Residents totally dependent on social services for survival are often economically marginalized and thus more vulnerable; special needs populations (infirmed) require more time for evacuation and recovery is often difficult

*Source: Heinz Center 2002; Cutter et al. 2003.

3.1.2 Calculation of the Social Vulnerability Index

Thirty-two (32) variables were used in the SoVI-SC computation (Appendix Table 1.1), based on the research literature described above. To facilitate comparisons across counties, all data were from the US Census (2000) or other freely accessible data sources. The Census 2000 data represent true counts of the population and their characteristics. While more recent data (2005-2007) are available for some geographic areas of the state, these are either based on projections, not actual counts, or are derived from sample surveys such as those used in the American Community Survey (ACS) product by the US Census. One drawback of the ACS statistical portrait is the population threshold of 20,000. Counties, cities, and towns with less than 20,000 inhabitants are not included. For the purposes of SoVI-SC, these recent data pose problems because of the lack of statistical coverage of **all** counties within the state, and the fact that many of the specific variables needed to compute SoVI-SC are not available. A mix and match of different years for the same geography will not produce comparable scientific, spatial, or statistical results.

Data used in the assessment of county and census tract level social vulnerability for South Carolina was culled from numerous freely accessible online data sources (see Appendix 1). The thirty-two (32) variables were standardized and input into a principal components analysis (PCA) to reduce the number of variables into a smaller set of multi-dimensional attributes or components. Adjustments to the component's directionality were made to insure that positive values were associated with increasing vulnerability, and negative values associated with decreasing vulnerability. If a factor included negative and positive values that both influenced vulnerability (such as the elderly and the young), then the absolute value was used. Once the directionality was established, the components were added together to produce the final SoVI score for the South Carolina (SoVI-SC).

3.1.3 SoVI-SC Results

Seven distinct components explain 84% of the variance in the data for the SoVI-SC (Table 3.2). These components include wealth (per capita income, % rich, median rent); race and gendered employment (female headed households, female labor force participation, age (over 65, % under 18); working professionals (% females, labor force participation); ethnicity and migration (% Hispanics, % newly immigrated); rural special needs (nursing home residents, farm populations); and Native Americans. These components and the level of explained variance are consistent with other SoVI studies for different states, regions, and for the U.S. as a whole. There has been considerable sensitivity testing of the SoVI metric to monitor its robustness at different spatial scales and in different places (Schmidtlein et al. 2008) and in different application domains (see http://sovius.org).

Table 3.2: Social Vulnerability Index-South Carolina (SoVI-SC)

Component	Cardinality	Name	% Variance Explained
1	-	Urbanization and wealth	38.5
2	+	Race, gender, and unemployed	15.8
3	‖	Age	8.4
4	-	Employment	7.7
5	+	Migrants and ethnicity	6.0
6	+	Rural special needs	4.2
7	+	Race & ethnicity-Native Americans	3.6
Total Variance Explained			84.2

The social vulnerability scores for each county, ranged from 7.31 indicating the most vulnerable (Saluda County) to -2.37, the least vulnerable (Union County, SC). We also computed the SoVI-SC for all census tracts within the state. The scores were then mapped using a three-class standard deviation method. The standard deviations preserve the underlying distribution of the data (mean of zero and one-half standard deviation on either side). The moderate category represents the mean; the elevated category is greater than one-half standard deviation above the mean; and the low category is more than one-half standard deviation below the mean. This method provides a balance between interpretation (3 classes) and the identification and visualization of extremes (high and low vulnerability that are of the most interest) (Figure 3.1).

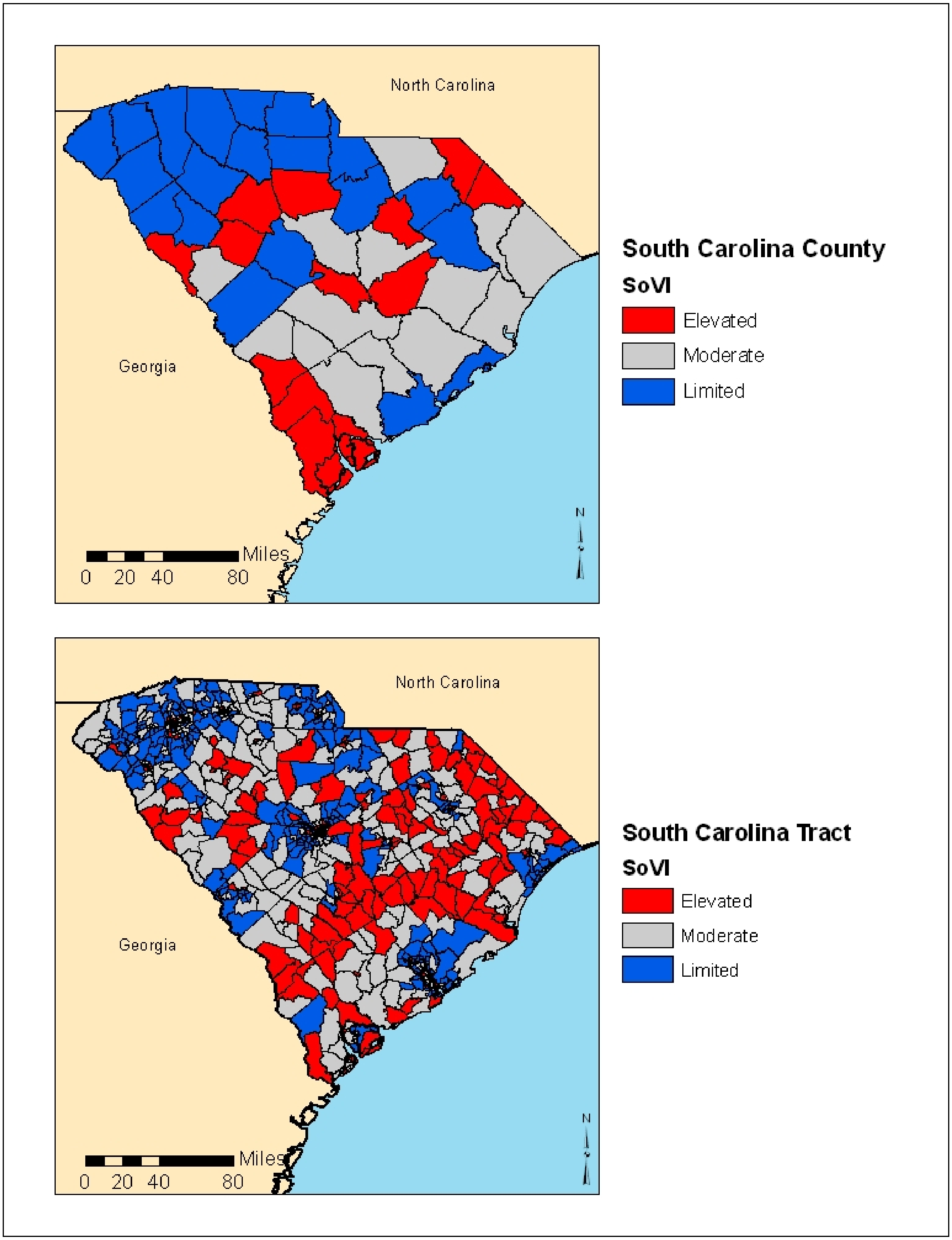

Figure 3.1: Social Vulnerability for South Carolina Counties and Census Tracts

3.1.3.1 County Level SoVI

Four county level clusters of elevated social vulnerability within the state are evident in Figure 3.1. These are: 1) Low Country, including Allendale, Beaufort, Hampton, and Jasper Counties; 2) portions of the Pee Dee, encompassing Dillon and Marlboro Counties; 3) Western Midlands, including Fairfield, Newberry Saluda and McCormick Counties, and 4) Southern Midlands including Calhoun, Clarendon, and Lee. All of the counties within the elevated SoVI classification have demographic characteristics that negatively influence their ability to prepare for and respond to hazards.

While these counties (as a whole) appear to have greater vulnerability, it is important to note that not every person, family, or household within each county has the same level of vulnerability. Table 3.3 identifies that main drivers or contributing factors that influence SoVI scores. Identified as components those scores highlighted in red are increasing the social vulnerability for the county, while those highlighted in green reduce social vulnerability. For example, Saluda County has the highest SoVI score in the state at 7.3. However, this score is being influenced most by three components, Hispanic migrants (Component 5) and rural special needs populations (Component 6) which increase the vulnerability when compared to other counties, while lower unemployment, lower numbers of minority populations and lower female headed households (Component 2 in green highlight) reduce the vulnerability score .

Several clusters of limited or low social vulnerability are also depicted in Figure 3.1. One large cluster covering the western and central portion of the Upstate region, including: Abbeville, Anderson, Cherokee, Chester, Greenville, Greenwood, Kershaw, Lancaster, Laurens, Oconee, Pickens, Spartanburg, Union, and York Counties; another cluster in western midlands comprised of Aiken and Lexington Counties; and a third in the east central portion of the state made up of Darlington and Florence exhibit the lowest levels of social vulnerability in the state. While all of these counties are designated "limited" by classification, there are positive and negative influences on vulnerability at work in each county. The red and green shaded cells in Table 3.4 indicate the main driving or contributing factors to increased or decreased levels of vulnerability for each of these counties. Union County, for example, has the lowest SoVI score in the state at -2.37. This low SoVI score is being driven by the fact that the county has a balanced age distribution (component 3), has a relatively low number of rural/special needs populations (component 5), and has a smaller Native American population (component 6) when compared to the remainder of the state.

Table 3.3: Counties Ranked by Social Vulnerability Score Percentile

Rank	County	Comp 1	Comp 2	Comp 3	Comp 4	Comp 5	Comp 6	Comp 7	Total SoVI Score	SoVI Class
1	Saluda	0.923	-1.115	0.635	-0.085	3.637	2.508	0.812	7.315	3
2	Dillon	0.729	0.883	0.844	-0.769	0.869	0.4	2.814	5.769	3
3	Marlboro	0.58	0.678	0.042	0.046	-1.343	-0.265	5.058	4.797	3
4	Lee	0.861	1.259	0.353	0.312	1.017	1.33	-0.454	4.678	3
5	McCormick	0.184	0.039	2.544	1.939	-2.733	2.284	0.329	4.585	3
6	Jasper	1.137	-0.731	1.367	2.845	1.723	-1.493	-0.281	4.565	3
7	Allendale	0.696	2.336	0.228	1.676	-0.024	-0.913	-0.045	3.954	3
8	Clarendon	0.871	0.514	0.922	0.738	-0.007	0.084	-0.004	3.118	3
9	Hampton	1.068	0.299	0.476	1.629	0.343	-0.651	-0.225	2.939	3
10	Beaufort	-2.281	-0.228	1.571	2.454	1.867	-0.679	0.061	2.764	3
11	Newberry	0.191	0.016	0.801	-0.565	1.432	0.672	0.195	2.742	3
12	Calhoun	0.664	-0.325	0.747	-0.388	0.272	2.286	-0.622	2.635	3
13	Fairfield	0.35	0.799	0.208	-0.085	-0.296	1.338	-0.182	2.133	3
14	Chesterfield	0.947	-0.285	0.327	-0.754	0.88	0.567	0.272	1.955	2
15	Berkeley	-0.125	-1.166	2.681	1.347	-1.005	0.047	0.002	1.78	2
16	Edgefield	0.727	-0.704	1.001	1.832	-1.204	1.09	-1.086	1.657	2
17	Bamberg	0.761	1.331	0.408	-0.41	0.206	-0.366	-0.529	1.401	2
18	Georgetown	-0.498	0.078	1.797	0.731	-0.134	-0.587	-0.243	1.143	2
19	Orangeburg	0.109	1.165	0.16	-0.445	-0.37	0.49	0.023	1.131	2
20	Barnwell	0.775	0.134	0.85	-0.254	-0.309	1.063	-1.214	1.045	2
21	Sumter	-0.17	0.495	1.178	0.184	-0.351	-0.845	0.414	0.905	2
22	Richland	-2.815	1.447	0.957	0.037	-0.101	0.659	0.251	0.435	2
23	Horry	-1.119	-0.659	2.27	0.626	0.05	-1.167	0.432	0.433	2
24	Colleton	1.015	-0.43	0.304	0.637	-0.329	-1.002	0.198	0.393	2
25	Williamsburg	0.974	1.808	0.091	0.049	-0.554	-1.149	-1.097	0.122	2
26	Marion	0.226	2.112	0.263	-1.211	0.784	-0.984	-1.179	0.011	2
27	Dorchester	-0.943	-0.763	1.516	0.119	-1.069	0.718	0.35	-0.072	2
28	York	-0.923	-0.885	1.024	-0.478	-0.162	0.342	0.576	-0.505	1
29	Darlington	0.084	0.647	0.245	-0.652	-0.637	0.258	-0.518	-0.573	1
30	Florence	-1.074	1.167	0.245	-1.138	-0.35	0.908	-0.685	-0.927	1
31	Laurens	0.642	-0.418	0.248	-0.892	0.578	-0.69	-0.428	-0.961	1
32	Abbeville	0.761	-0.704	0.726	-1.188	-0.064	-0.21	-0.376	-1.054	1
33	Charleston	-2.762	1.275	0.094	0.233	0.221	0.044	-0.37	-1.265	1
34	Chester	0.683	-0.096	0.181	-0.794	-0.582	-0.461	-0.288	-1.357	1
35	Aiken	-0.448	-0.686	0.469	-0.071	-0.765	1.198	-1.069	-1.372	1
36	Greenwood	-0.708	0.353	0.143	-1.094	0.903	-0.963	-0.183	-1.55	1
37	Greenville	-1.846	-0.634	0.311	-0.447	0.915	-0.262	0.316	-1.646	1
38	Lancaster	0.429	-0.859	0.257	-0.85	-0.038	-0.759	0.164	-1.657	1
39	Cherokee	0.67	-0.971	0.434	-0.675	-0.02	-1.17	-0.039	-1.769	1
40	Kershaw	0.171	-0.866	0.247	-0.502	-0.644	-0.071	-0.371	-2.036	1
41	Pickens	-0.27	-1.257	0.692	-0.039	-0.004	-0.983	-0.22	-2.082	1
42	Lexington	-0.95	-1.401	0.98	-0.498	-0.297	0.52	-0.436	-2.081	1
43	Spartanburg	-0.847	-0.749	0.175	-0.568	-0.123	-0.451	0.383	-2.179	1
44	Oconee	0.447	-1.977	1.525	-0.369	-0.548	-0.974	-0.376	-2.27	1
45	Anderson	0.3	-1.05	-0.54	0.88	-0.36	-0.39	0.15	-2.3	1
46	Union	-0.41	0.13	-1.29	1.33	-1.28	-1.32	-0.28	-2.37	1

Comp 1: Urban and Wealth, Comp 2: Unemployment, Race-Black, & Female Headed Households, Comp3: Age over 65 & Age Under 18, Comp 4: White Working Females, Comp 5: Hispanic Migrants, Comp 6: Rural Special Needs, Comp 7: Native Americans

3.1.3.2 Sub-County Level SoVI

While the county level SoVI provides a broad overview of the relative levels of social vulnerability for the counties, it is clear that even within counties there is considerable variability in the social vulnerability of residents. To describe such variation, a sub-county social vulnerability score was also computed for each census tract within the state (Figure 3.1). From this perspective, one can see how the social vulnerability is concentrated in some of the most rural and economically depressed regions of the state stretching along the I-95 corridor and throughout the Pee Dee region. The census tract view of SoVI provides useful information for individual counties in determining where their resources might be most effectively utilized to enhance preparedness, response, and recovery. Appendix II provides county specific SoVI maps by census tract as part of the county vignettes.

3.1.3.3 Social Vulnerability and Population Density

The Social Vulnerability Index provides one measure for assessing vulnerability. Another equally important consideration is the total population at risk including the population density within areas (counties or census tracts, for example). Planning for a highly socially vulnerable population in a low density county poses different challenges than developing plans for a similarly-vulnerable population in a high density setting. To examine the relationship between social vulnerability and population density, these two variables were mapped at the county level (Figure 3.2). Counties that score in the elevated category for both social vulnerability and population density (those shaded in black) pose more challenges for emergency management than those in the limited categories (shaded in light gray). Beaufort County, followed by Richland, Horry, and Dillon contain the highest population densities and socially vulnerable populations. Charleston also has elevated densities, but the overall social vulnerability for the county is limited. Again, when looking at sub-county data, there are tracts within the county that contain elevated levels of social vulnerability.

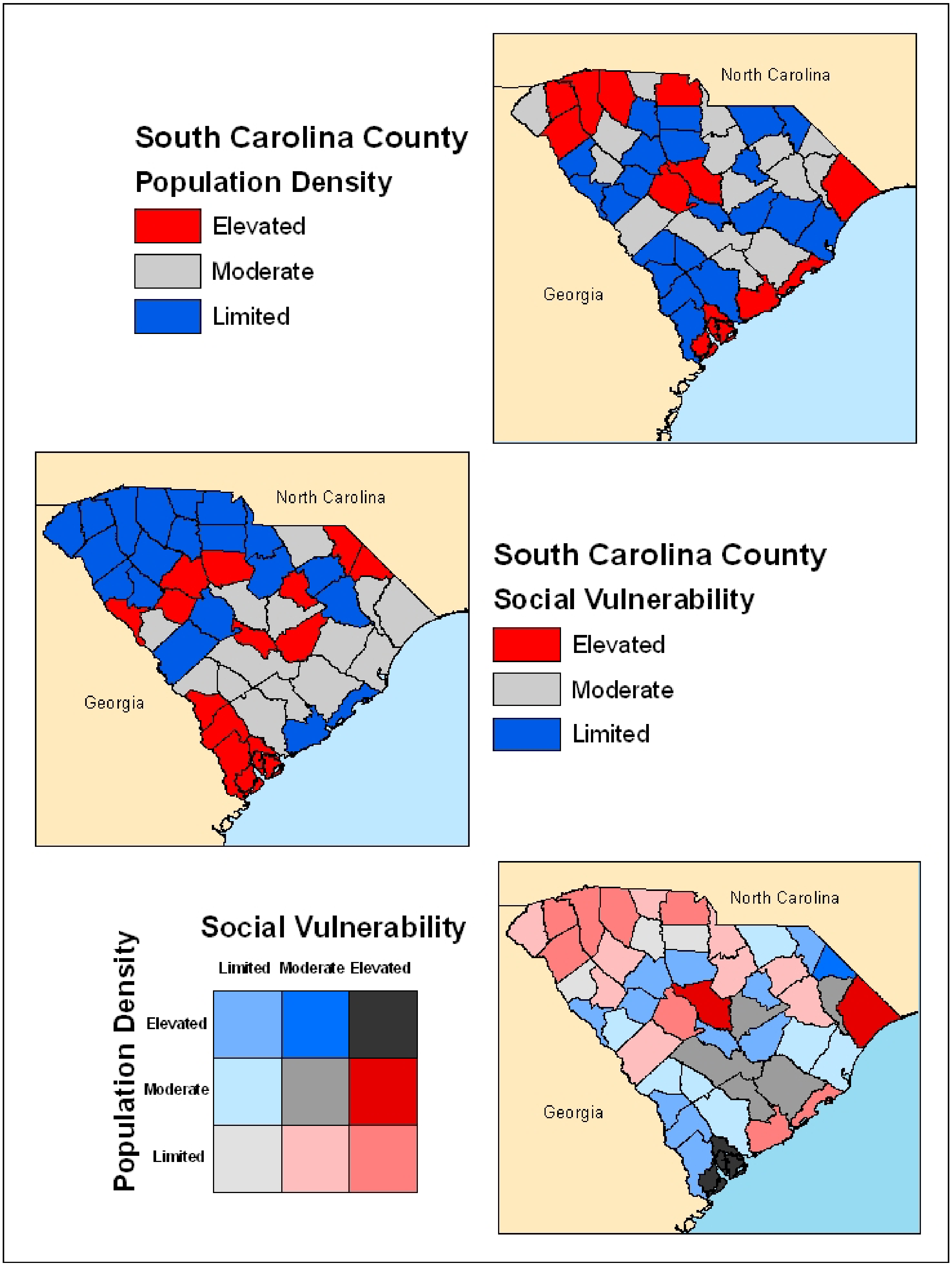

Figure 3.2: Population Density and Social Vulnerability for South Carolina Counties

3.2 Hazard Identification

The assessment process begins with the identification of all the principal hazards threatening the community. Each South Carolina county and municipality has a unique combination of natural, technological, and societal hazards that could harm specific areas or damage important community assets or functions. Because this assessment was generated for use at the state level, hazards listed in the *South Carolina Emergency Operations Plan 2009* (EOP) are included, along with NCDC Storm Data Report hazards. Listed below are the hazards included in this assessment.

3.2.1 Hazards Included

Twenty-four specific hazard types are included in this assessment and are broken into numerous broad categories consistent with the state risk assessment:

- Coastal Events, including Hurricanes/Tropical Storms, Ocean & Lake Surf, and Waterspout
- Dam Failure
- Drought
- Flood
- Fog
- Geophysical Events, including Avalanche, Earthquake, and Landslide
- Human-Induced Hazard Events, including Civil Disturbance, Hazardous Materials (HAZMAT), Nuclear Power Plants, Terrorism, and Transportation (Motor Vehicle)
- Severe Thunderstorm Events, including Funnel Cloud, Hail, Heavy Precipitation, Lightning, Thunderstorm Wind, and Tornado
- Temperature Extreme
- Wildfire
- Winter Weather (Snow & Ice)

While these hazards are not inclusive of every possible hazard type for South Carolina they do include those events most likely to cause adverse impacts on the populations and property of the state.

3.2.2 Data Acquisition

Frequency data were initially gathered from the *South Carolina Atlas of Environmental Risks and Hazards* (Cutter et al. 1999) for events from 1975-1996. These data then were updated through 2008 by USC's Hazards and Vulnerability Research Institute based on data from the National Climatic Data Center (NCDC Storm Data Reports Online, 2009) Storm Data and SHELDUS (Spatial Hazard Event and Loss Database for the U.S. (www.sheldus.org). Table 3.4 outlines the main data sources for each of the specific hazard event types used in this assessment.

Table 3.4: Hazards and source data included in the state assessment

Hazard	Data Sources
Coastal Events	
Hurricane/Tropical Storm	NCDC Storm Data Reports Online, 2009, SHELDUS 2009
Ocean & Lake Surf	NCDC Storm Data Reports Online, 2009, SHELDUS 2009
Waterspout	NCDC Storm Data Reports Online, 2009, SHELDUS 2009
Dam Failure	NPDP Database
Drought	NCDC Storm Data Reports Online, 2009, SHELDUS 2009
Flood	NCDC Storm Data Reports Online, 2009, SHELDUS 2009
Fog	NCDC Storm Data Reports Online, 2009, SHELDUS 2009
Geophysical Events	
Avalanche	South Carolina Seismic Network
Earthquake	NCDC Storm Data Reports Online, 2009, SHELDUS 2009
Landslide	NCDC Storm Data Reports Online, 2009, SHELDUS 2009
Human-Induced Events	
Civil Disturbance	No data available
Hazardous Materials (HAZMAT)	National Response Center
Nuclear Power Plant	Nuclear Regulatory Commission
Terrorism	No data available
Transportation (Motor Vehicle)	South Carolina Department of Public Safety
Severe Thunderstorm Events	
Funnel Cloud	NCDC Storm Data Reports Online, 2009, SHELDUS 2009
Hail	NCDC Storm Data Reports Online, 2009, SHELDUS 2009
Heavy Precipitation	NCDC Storm Data Reports Online, 2009, SHELDUS 2009
Lightning	NCDC Storm Data Reports Online, 2009, SHELDUS 2009
Thunderstorm Wind	NCDC Storm Data Reports Online, 2009, SHELDUS 2009
Tornado	NCDC Storm Data Reports Online, 2009, SHELDUS 2009
Temperature Extremes	NCDC Storm Data Reports Online, 2009, SHELDUS 2009
Wildfire	South Carolina Forestry Commission
Winter Weather (Snow & Ice)	NCDC Storm Data Reports Online, 2009, SHELDUS 2009

3.2.3 Hazard Frequency of Occurrence

The estimated occurrence of the hazard is a useful element in the assessment. One can easily distinguish between infrequent hazards like earthquakes and frequent hazards like hazardous materials incidents based on frequency of occurrence. The hazard frequency of occurrence (historical probability) is a simple calculation based on historical data and the length of that record in years. The number of historical hazard occurrences divided by the number of years in the record yields the percent chance of the event occurring in any given year.

Example: *If hypothetical hazard "A" occurred 17 times over the past 20 years, the chance of occurrence for that hazard "A" in any given year is 17/20 (0.85) or less than once per year.*

Some hazards are geographically specific (e.g. flooding) and should have a frequency of occurrence score assigned to only a targeted area or hazard zone. Because the intention of this assessment is for use at the state level, no sub-county data or zoning are included; instead frequencies are calculated for the entire county (see Appendix II). Table 3.5 is an example of the calculation for all hazards for the entire state. The "-" symbol indicates there is no record of events from this hazard type.

Values for Table 3.5 were calculated using the following method:

1. The 'Number of Events' column is simply the number of recorded events summed over the number of years in the record. For example: County "X" had a total of three tornadoes in 1998, four in 1999, and 2 in 2000. For that particular hazard, County "X" had a total of nine tornado events in the three years researched.

$$3 + 4 + 2 = 9$$

2. The 'Years in Record' column is simply the number of years researched. Three years were used in the previous example.

3. The 'Recurrence Interval (years)' column is the calculated number of times an event can occur in any given year. To determine the 'Recurrence Interval (years)' divide the 'Years in Record' by the 'Number of Events'. In the example here the recurrence interval is calculated by dividing 3 years by 9 events, which equals 0.33 years.

$$\textbf{Recurrence Interval (years)} = \frac{\textbf{Years in Record}}{\textbf{Number of Events}}$$

Or

$$\textbf{Recurrence Interval (years)} = \frac{\textbf{3 years}}{\textbf{9 events}}$$

Using this example, one would expect this particular event type to occur every 0.33 years or roughly three times per year.

4. The 'Hazard Frequency % Chance/year' is the probability (or chance) that a hazard will occur in any given year. To determine the percentage, divide the 'Number of Events' by the 'Years in Record' and multiply by 100. In the example here the hazard frequency (probability) is calculated by dividing 9 events by 3 years and multiplying the quotient by 100 which equals 300%.

$$\textbf{Hazard Frequency \% Chance/year} = \frac{\textbf{Number of Events}}{\textbf{Years in Record}} \quad \textbf{X} \quad \textbf{100}$$

Or

$$\textbf{Hazard Frequency \% Chance/year} = \frac{\textbf{9}}{\textbf{3}} \quad \textbf{X} \quad \textbf{100}$$

Using this example, the percent chance of this event type occurring in any given year is 300%.

Table 3.5: South Carolina Hazard Frequencies

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	85	158	1.86	53.79
Ocean & Lake Surf[b]	32	16	0.50	200.00**
Waterspout	33	16	<0.50	206.25**
Dam Failure	-	-	-	-
Drought	64	59	0.92	108.47**
Flood	706	59	<0.50	1,196.61**
Fog	9	12	1.33	75.00
Geophysical Events				
Avalanche	1	49	49.00	2.04
Earthquake	1,543	310	<0.50	497.74**
Landslide	1	49	49.00	2.04
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (HAZMAT)	9,535	22	<0.50	43,340.91**
Nuclear Power Plant	1	8	8.00	12.50
Terrorism	2	38	19.00	5.26
Transportation (Motor Vehicle)	974,302	10	<0.50	9,743,020.00**
Severe Thunderstorm Events				
Funnel Cloud	54	16	<0.50	337.50**
Hail	3,894	59	<0.50	6,600.00**
Heavy Precipitation	119	15	<0.50	793.33**
Lightning	370	16	<0.50	2,312.50**
Thunderstorm Wind	7,024	59	<0.50	11,905.08**
Tornado	900	59	<0.50	1,525.42**
Temperature Extremes	54	16	<0.50	337.50**
Wildfire	92,286	21	<0.50	439,457.14**
Winter Weather (Snow & Ice)	155	59	<0.50	262.71**

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/)
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

3.2.4 Total Hazard Score

To create an overall picture of the frequency of hazard occurrences for the state, we generated total hazard scores for each individual hazard for each county (Table 3.6). These scores were constructed by summing the frequency of occurrence (percent chance per year) for each hazard for each county. The summed total was then divided by 100 (to reduce the large numbers) and rounded to three digits. Given the frequency and relatively low losses from motor vehicle accidents, these were excluded from the computation of the total hazard score.

Table 3.6: County Hazard Scores

Rank	County	Total All-Hazards Score
1	Charleston	10.128
2	Greenville	9.576
3	Spartanburg	8.596
4	Berkeley	7.480
5	Horry	7.131
6	Anderson	6.713
7	Laurens	6.238
8	Beaufort	5.896
9	Colleton	5.395
10	Oconee	5.360
11	Pickens	5.351
12	Richland	5.074
13	Orangeburg	4.549
14	Dorchester	4.492
15	York	4.450
16	Cherokee	4.362
17	Chester	4.188
18	Georgetown	4.141
19	Lexington	3.840
20	Florence	3.771
21	Greenwood	3.682
22	Jasper	3.221
23	Abbeville	3.104
24	Aiken	3.073
25	Union	3.067
26	Williamsburg	2.502
27	Clarendon	2.452
28	Fairfield	2.370
29	Darlington	2.362
30	Kershaw	2.238
31	Barnwell	2.203
32	Hampton	2.152
33	Sumter	1.992
34	Chesterfield	1.833
35	Allendale	1.817
36	Newberry	1.685
37	Marlboro	1.665
38	Lancaster	1.476
39	Marion	1.343
40	Bamberg	1.254
41	Dillon	1.142
42	Calhoun	1.114
43	Lee	0.949
44	Saluda	0.721
45	McCormick	0.670
46	Edgefield	0.541

*Total excludes motor vehicle transportation accidents

McCormick has the highest frequency of hazards, largely driven by wildfires and hazardous materials accidents, followed by Lancaster (Appendix II, Table 2.1). Jasper County had the least hazard events. To reduce the effect of large numbers of hazard events (e.g. wildfires versus earthquakes), the frequency of occurrence was standardized using a minimum-maximum transformation, where the largest value becomes a 1.00 and the smallest value becomes 0.0. In this way, summing across all hazard events would produce a maximum hazard score of 23.0 if that county was the highest on each individual hazard type. In addition to transportation accidents, civil disorder, and dams are also excluded from the total hazard score. Table 3.6 shows that Charleston County has the highest hazard score, followed by Greenville, Spartanburg, Anderson, and Laurens. Edgefield has the lowest hazards score.

4 PLACE VULNERABILITY AND IMPACT

Place Vulnerability for a county was determined by adding its Total Hazard Score (hereafter referred to as Hazard Occurrence score), and the Total Social (Vulnerability) Score. Choropleth maps for each score category (Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability) are provided to give spatial representation of category scores. These maps were created using standard deviations, where greater than .5 standard deviation equals elevated; .5 to -.5 equals moderate; and less than -.5 equals limited. Results for each hazard category are explained, followed by a final hazard assessment. Any significant events that occurred during the update period (2006-2008) are noted. The analyses are presented by hazard in the order they appear in the state EOP.

Charleston has the highest total of place vulnerability, followed by Berkeley, Beaufort, and Saluda (Table 4.1). In the case of Charleston, the ranking is largely based on the hazard frequency. The same is true for Greenville. In the case of Saluda County, the hazard score is low, but the County has the highest level of social vulnerability in the state which contributes to the overall ranking. For Berkeley and Beaufort it is a combination of the hazards occurrence and the social vulnerability that contribute to the overall place vulnerability.

When depicting these relationships in map form (Figure 4.1), a number of interesting patterns emerge. First, the hazard occurrence shows two clusters of elevated levels (top map): one for coastal counties (except Georgetown) and the other for Upstate counties. When combined with social vulnerability, only one county stands out stand out in terms of elevated hazards and elevated social vulnerability: Beaufort (Figure 4.1 bottom). It is in this county that priority for planning and mitigation should be focused. A second priority for planning and mitigation would be for those counties shaded in dark blue or red. The counties in dark blue have elevated levels of hazard, but only moderate levels of social vulnerability. These include Horry, Berkeley, Colleton, and Richland. Counties shaded in red have a combination of a moderate hazard level with an elevated social vulnerability. Jasper County falls into this category. A third priority for planning and mitigation would those counties that are in the elevated hazard category, but have limited social vulnerability (shaded in medium blue). These counties include Charleston, and most of the Upstate Counties.

Table 4.1: Place Vulnerability Scores

Rank	County	Standardized Hazard Score*	Standardized SoVI Score	All-Hazards Total Place Vulnerability
1	Charleston	1.000	0.11	1.114
2	Berkeley	0.724	0.43	1.152
3	Beaufort	0.559	0.53	1.089
4	Saluda	0.019	1.00	1.019
5	Greenville	0.942	0.07	1.017
6	Jasper	0.280	0.72	0.996
7	Horry	0.687	0.29	0.977
8	Dillon	0.063	0.84	0.903
9	Spartanburg	0.840	0.02	0.860
10	Marlboro	0.117	0.74	0.857
11	Colleton	0.506	0.29	0.792
12	Allendale	0.133	0.65	0.786
13	Orangeburg	0.418	0.36	0.780
14	Lee	0.043	0.73	0.770
15	Clarendon	0.199	0.57	0.766
16	Richland	0.473	0.29	0.762
17	Laurens	0.594	0.15	0.740
18	Georgetown	0.375	0.36	0.738
19	McCormick	0.013	0.72	0.732
20	Hampton	0.168	0.55	0.716
21	Fairfield	0.191	0.46	0.656
22	Anderson	0.644	0.01	0.651
23	Dorchester	0.412	0.24	0.649
24	Newberry	0.119	0.53	0.647
25	York	0.408	0.19	0.600
26	Chesterfield	0.135	0.45	0.581
27	Calhoun	0.060	0.52	0.577
28	Pickens	0.502	0.03	0.531
29	Barnwell	0.173	0.35	0.526
30	Oconee	0.503	0.01	0.513
31	Sumter	0.151	0.34	0.489
32	Florence	0.337	0.15	0.486
33	Chester	0.380	0.10	0.485
34	Bamberg	0.074	0.39	0.464
35	Williamsburg	0.205	0.26	0.462
36	Cherokee	0.399	0.06	0.461
37	Edgefield	0.000	0.42	0.416
38	Greenwood	0.328	0.08	0.412
39	Abbeville	0.267	0.14	0.403
40	Darlington	0.190	0.19	0.375
41	Lexington	0.344	0.03	0.374
42	Aiken	0.264	0.10	0.367
43	Marion	0.084	0.25	0.330
44	Union	0.263	0.00	0.263
45	Kershaw	0.177	0.03	0.212
46	Lancaster	0.097	0.07	0.171

*This does not include transportation incidents

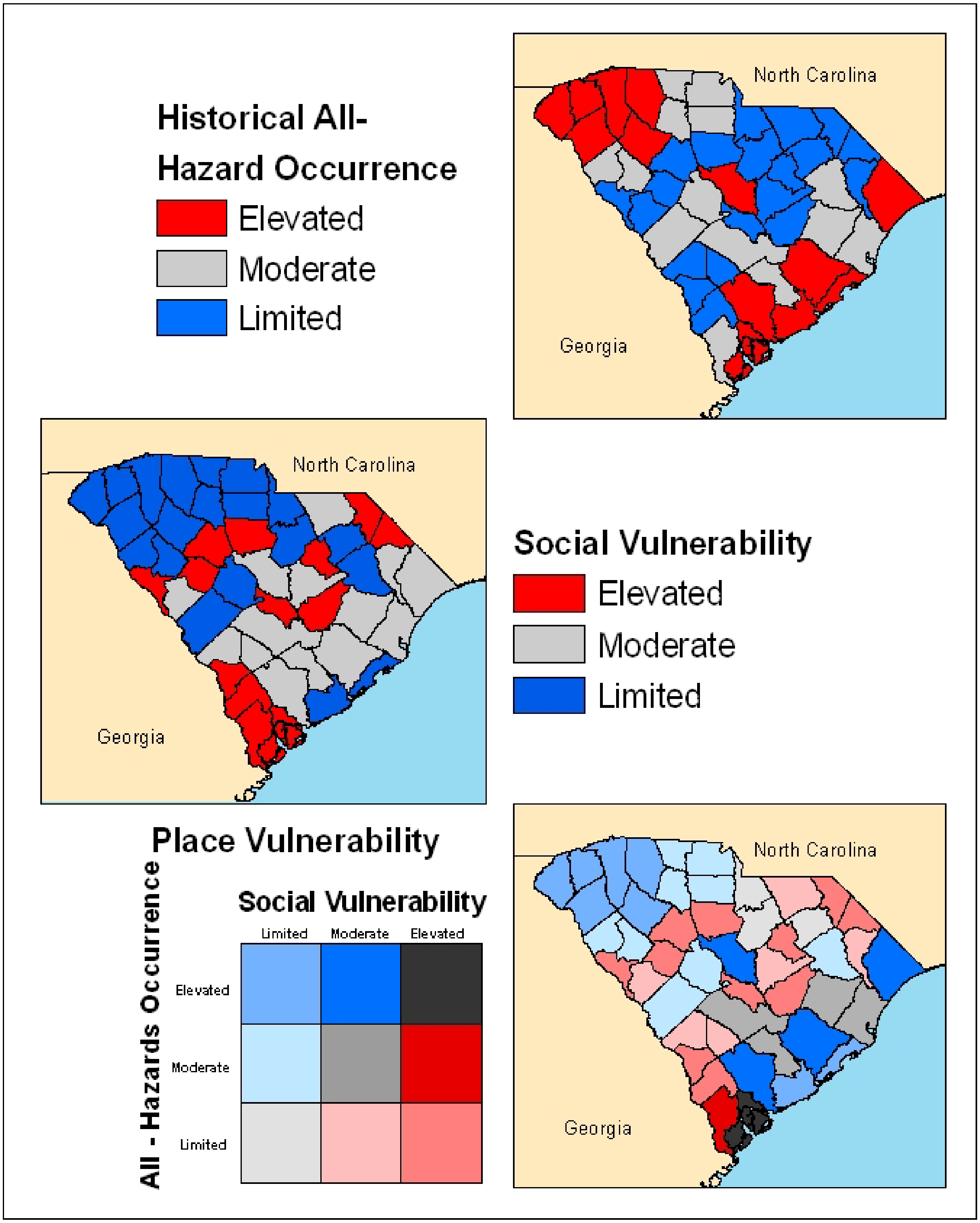

Figure 4.1: Hazard Frequency, Social Vulnerability, and Place Vulnerability Scores for All Hazards

5 INDIVIDUAL HAZARD EVENTS

5.1 Coastal Events

The National Climatic Data Center (NCDC) generally classifies coastal events into three broad categories: 1) Hurricanes and tropical storms; 2) Ocean and Lake Surf; and 3) Waterspouts. However, there are some instances where NDCD has classified hazard events impacting the coast that are not included in other event categories (hurricane, flood, ocean and lake surf) as coastal events. These events include large nor'easter storms that do not readily fit into other hazard classes. Events such as these may affect the entire state including the Upstate counties. NDCD has also occasionally classified events as "coastal" because of the pre-existing classification scheme developed and utilized by their Agency (NCDC Storm Data Reports Online, 2009) for reporting storm data. In some instances, NCDC classified an event as a coastal event but did not provide enough additional information to re-designate said event into a more logical category. Users of this data must keep in mind that, because of these classification issues, inland counties may have some losses from "coastal" events.

This section discusses the three main sub-categories of coastal storms by first describing the hazard being analyzed, followed by a discussion of the interaction between social vulnerability and the specific hazard event in question. Finally, historic events that have impacted the state are discussed in detail to aid in the understanding of hazard impacts from coastal events.

5.1.1 Hurricane and Tropical Storm

Figure 5.1 shows all historical hurricane and tropical storm tracks within 100 miles of South Carolina from 1851 to 2008. A closer examination of the period 1978-2008 (Figure 5.2) shows those tropical storms and hurricanes that affected the state as well as the Saffir-Simpson storm category. Frequency data analyzed for the hurricane and tropical storm score represent **only** those hurricanes and tropical storms that made landfall in and/or whose tract intersected South Carolina between the years 1851 – 2008. For example in 1989 Hurricane Hugo made landfall on the coastline near Charleston and passed through eleven counties before crossing into North Carolina. Every time a county border was intersected by the hurricane track it was recorded as having had one hurricane event.

Coastal counties exhibit a highest standardized hazard score for the state (Orangeburg, Williamsburg, and Richland Counties are the only inland counties included in the top ten standardized hazard score matrix) (Table 5.1). The top choropleth map in Figure 5.3 represents the hurricane and tropical storm frequency from 1851 to 2008. Many inner coastal or non-coastal counties fall into the moderate historical hazard occurrence category. This results from storms approaching South Carolina from the Gulf of Mexico, rather than approaching from the Atlantic.

The highest Social Vulnerability scores were in Saluda, Dillon, Marlboro, Lee, and McCormick Counties. The middle choropleth map in Figure 5.3 represents the Social Vulnerability scores for the state (see section 3.1).

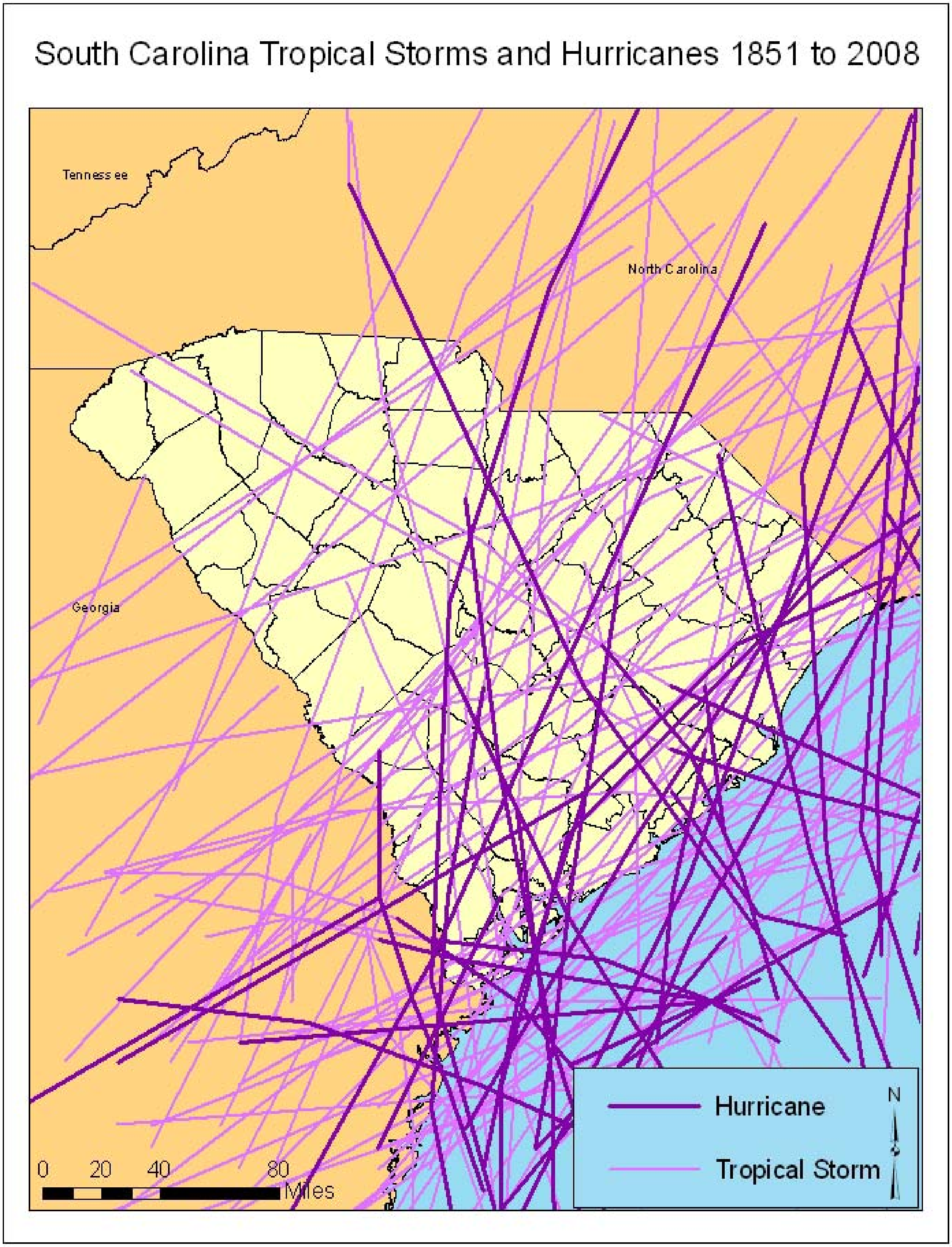

Figure 5.1: Hurricanes and Tropical Storms Passing within 100 miles of South Carolina 1851-2008

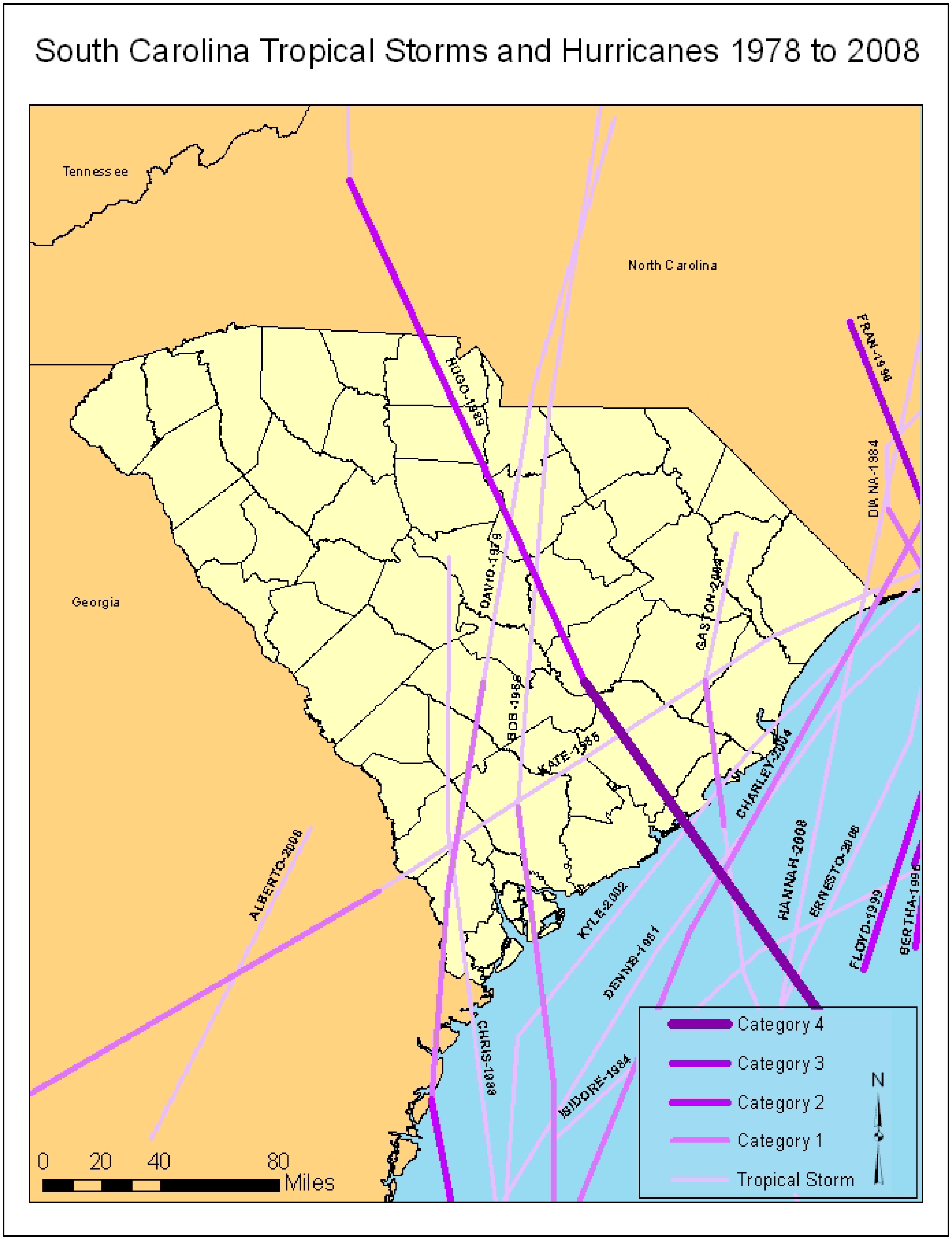

Figure 5.2: Hurricanes within 100 Miles that Affected South Carolina 1978-2008

Four coastal counties fell within the top ten for Place Vulnerability. In addition to the coastal counties, many inland counties exhibiting an elevated SoVI score are shown to have a high Place Vulnerability. This result is due in part to three hurricanes (David in 1979, Bob in 1985, and Hugo in 1989) and one tropical storm that crossed the state during this time period, coupled with the high social vulnerability scores of these counties. Five counties in the state fell into the category for elevated Social Vulnerability and elevated Hazard Occurrence (the bottom choropleth map); however Jasper and Beaufort counties are the only coastal counties. Allendale, Calhoun, and Clarendon are all inland counties that have experienced an elevated number of hurricanes or tropical storms within their political boundaries. Priority for planning and hazard mitigation for hurricane hazards should be directed toward Allendale, Calhoun, Clarendon, Jasper, and Beaufort Counties, who combine elevated levels of hazard occurrence as well as elevated levels of social vulnerability. The bottom choropleth map in Figure 5.3 represents the total Place Vulnerability scores for the hurricane/tropical storm hazard. Charleston county's relative ranking on the hazard score (number 4) is reduced because of its limited social vulnerability.

Remember, not only are these results driven by demographic data, but this analysis also is based on **only** those hurricanes and tropical storms that made landfall in and/or whose track intersected the state. It is well known that coastal counties are adversely affected by the many hurricanes and tropical storms that never make landfall, but rather skirt the coast causing major damage from storm surges, wind, and large amounts of rainfall. The most recent example of this is Hurricane Floyd. In 1999, twenty-seven South Carolina counties were included in the Presidential Disaster Declaration for Hurricane Floyd. This storm never intersected South Carolina's borders, yet caused extensive damage to the state. While not included in the frequency calculation (given our criteria), it is included in the loss and impact calculations as a significant event. A high priority should be placed on preparing for storms such as these, where there is no landfall, but the impact of the wind field is felt, especially in coastal counties.

South Carolina has been affected by four hurricanes or tropical storms since the start of the 2006 hurricane season. These events accounted for only $17.75 thousand in property damage and no deaths or injuries (HVRI, 2008). In 2006, two tropical systems affected the state; however their landfalls were made elsewhere. Tropical Storm Alberto moved northward from the Florida panhandle through the Midlands leaving two to four inches of rain. As the Alberto crossed the state, it produced five F0 tornadoes, there were in Charleston County. Storm affects to the coast were minimal. Also in 2006, Tropical Storm Ernesto made landfall on the eastern coast of Brunswick County, NC. South Carolina was mostly spared from Ernesto from the strong winds. The strongest sustained wind in the state was 35 miles per hour recorded at the Myrtle Beach Airport. Horry County took the brunt of the storm with seven inches of rain falling in North Myrtle Beach, and isolated power outages throughout the county. At the peak of the storm 2,700 people were without power. Prior to landfall, Ernesto passed 70 miles east of Charleston. Folly Beach reported a wind gust of 40 miles per hour with minimal storm surge, and there were no major impacts to the beach. In 2007 no storms affected the state.

The 2008 hurricane season, had two storms affecting South Carolina, causing $17 thousand dollars in property damage. While Tropical Storm Fay was moving over northern Florida, tropical storm force winds were reported in Beaufort and Colleton Counties. In late

August, after making its final landfall, the remnants of Tropical Storm Fay moved up the Appalachians bringing 2 to 4 inches of rain throughout the state flooding in Richland and Lexington Counties near the city of Irmo. Shortly after Fay, Hurricane Hannah made landfall near the NC/SC boarder as a tropical storm with winds over 40 mph and heavy rain. Rainfall amounts measured between four and six inches in northern Horry County. There were multiple road closures within the county, due to the heavy rain, downed trees, and minor storm surge. Although the last several hurricanes and tropical storms have not caused as much damage as in the past, a large percentage of the state's property and crop losses can be attributed to Hurricane Hugo in 1989. Hugo, a category 3 hurricane at landfall just north of Charleston, maintained its strength as it passed to the east of Columbia causing billions of dollars in damages to property, crops, and infrastructure. This landmark event provided a poignant example of the devastating impacts that a large and powerful tropical event can have on this state. More information about the impacts of hurricane Hugo in 1989 compared with a modeled Hurricane Hugo 2009 event can be found at http://webra.cas.sc.edu/hvri/hugo/hugo.aspx.

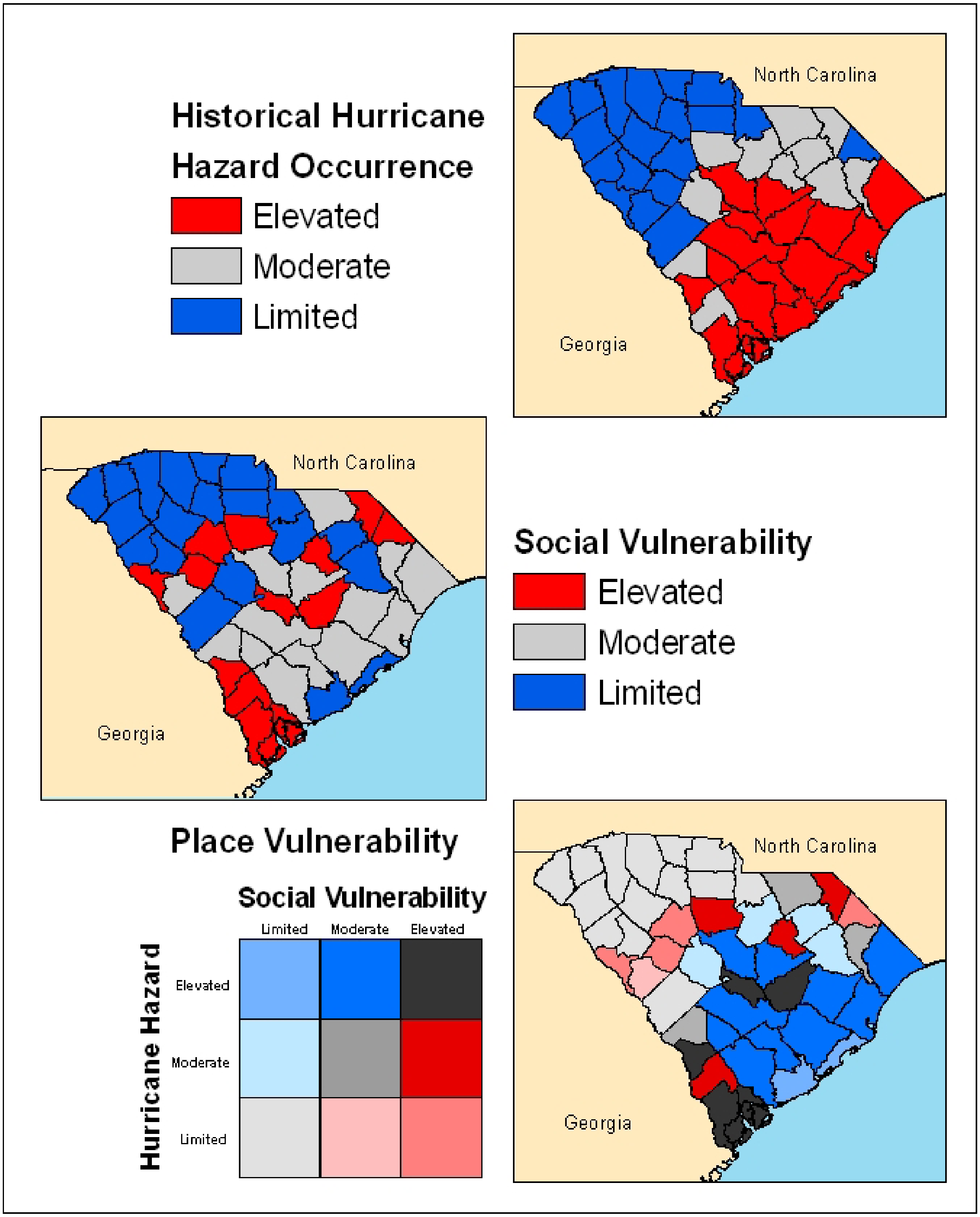

Figure 5.3: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Hurricane and Tropical Storm Hazards

Table 5.1: Counties Ranked by Place Vulnerability for Hurricane/Tropical Storm Hazards

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Jasper	4.565	0.72	11.39	0.68	1.396
2	Orangeburg	1.131	0.36	16.46	1.00	1.361
3	Berkeley	1.78	0.43	14.56	0.88	1.308
4	Beaufort	2.764	0.53	12.66	0.76	1.290
5	Marlboro	4.797	0.74	8.23	0.48	1.220
6	Allendale	3.954	0.65	9.49	0.56	1.213
7	Colleton	0.393	0.29	14.56	0.88	1.165
8	Lee	4.678	0.73	6.96	0.40	1.128
9	Clarendon	3.118	0.57	9.49	0.56	1.127
10	Saluda	7.315	1.00	2.53	0.12	1.120
11	Dillon	5.769	0.84	3.80	0.20	1.040
12	Calhoun	2.635	0.52	8.86	0.52	1.037
13	Hampton	2.939	0.55	8.23	0.48	1.028
14	Horry	0.433	0.29	12.03	0.72	1.009
15	Georgetown	1.143	0.36	10.76	0.64	1.003
16	Williamsburg	0.122	0.26	12.03	0.72	0.977
17	Bamberg	1.401	0.39	9.49	0.56	0.949
18	Richland	0.435	0.29	10.76	0.64	0.930
19	Sumter	0.905	0.34	9.49	0.56	0.898
20	Chesterfield	1.955	0.45	7.59	0.44	0.887
21	Charleston	-1.265	0.11	12.66	0.76	0.874
22	McCormick	4.585	0.72	2.53	0.12	0.838
23	Fairfield	2.133	0.46	6.33	0.36	0.825
24	Barnwell	1.045	0.35	7.59	0.44	0.793
25	Dorchester	-0.072	0.24	8.86	0.52	0.757
26	Newberry	2.742	0.53	3.80	0.20	0.728
27	Marion	0.011	0.25	8.23	0.48	0.726
28	Edgefield	1.657	0.42	1.90	0.08	0.496
29	Darlington	-0.573	0.19	5.06	0.28	0.466
30	York	-0.505	0.19	4.43	0.24	0.433
31	Florence	-0.927	0.15	5.06	0.28	0.429
32	Kershaw	-2.036	0.03	6.33	0.36	0.395
33	Lexington	-2.081	0.03	5.70	0.32	0.350
34	Lancaster	-1.657	0.07	4.43	0.24	0.314
35	Laurens	-0.961	0.15	3.16	0.16	0.306
36	Chester	-1.357	0.10	3.80	0.20	0.305
37	Aiken	-1.372	0.10	3.16	0.16	0.263
38	Greenwood	-1.55	0.08	2.53	0.12	0.205
39	Cherokee	-1.769	0.06	2.53	0.12	0.182
40	Abbeville	-1.054	0.14	1.27	0.04	0.176
41	Union	-2.37	0.00	3.16	0.16	0.160
42	Spartanburg	-2.179	0.02	2.53	0.12	0.140
43	Greenville	-1.646	0.07	1.27	0.04	0.115
44	Pickens	-2.082	0.03	1.27	0.04	0.070
45	Anderson	-2.3	0.01	1.27	0.04	0.047
46	Oconee	-2.27	0.01	0.63	0.00	0.011

5.1.2 Ocean & Lake Surf

Ocean and lake surf data represent all rip currents, coastal flooding, beach erosion, storm surge, and high surf events between 1993 and 2008. Historically, coastal counties are the only counties that have experienced this hazard. Horry, Charleston, Colleton, and Beaufort Counties have the greatest number of historical hazard occurrences (represented in the top choropleth map in Figure 5.4).

The highest Social Vulnerability scores were in Saluda, Dillon, Marlboro, Lee, and McCormick Counties. The middle choropleth map in Figure 5.4 represents the Social Vulnerability scores for the state (see section 3.1).

Horry County exhibits the greatest Place Vulnerability to ocean and lake surf hazard, while Beaufort, Charleston, and Colleton round out the top four counties (Table 5.2). Figure 5.4 (bottom) represents the Place Vulnerability for ocean and lake surf hazards and shows Beaufort County in the elevated category for both social vulnerability and the hazard occurrence. Priority for planning and mitigation of this hazard should be directed toward Beaufort County.

Since 2006, South Carolina has been affected by thirteen ocean and lake surf events. These events are responsible for five fatalities, no injuries, and no economic damages. Four of the five deaths occurred in Horry County and were caused by rip currents. The other causality was caused by a high surf event in Charleston County.

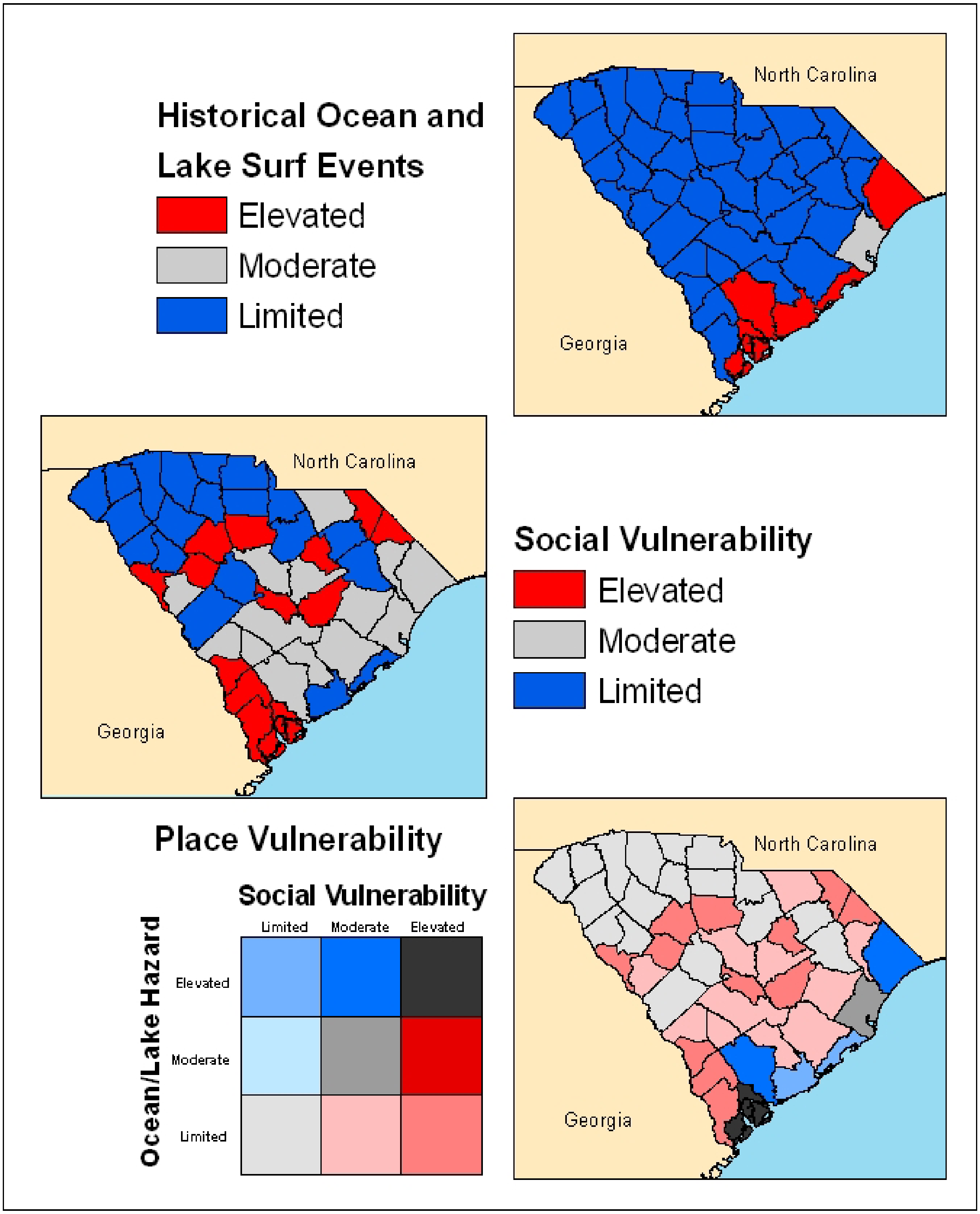

Figure 5.4: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Ocean and Lake Surf Hazards

Table 5.2: Counties Ranked by Place Vulnerability for Ocean and Lake Surf Hazards

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Horry	0.433	0.29	81.25	1.00	1.289
2	Beaufort	2.764	0.53	62.50	0.75	1.280
3	Charleston	-1.265	0.11	81.25	1.00	1.114
4	Colleton	0.393	0.29	62.50	0.75	1.035
5	Saluda	7.315	1.00	6.25	0.00	1.000
6	Jasper	4.565	0.72	25.00	0.25	0.966
7	Georgetown	1.143	0.36	43.75	0.50	0.863
8	Dillon	5.769	0.84	6.25	0.00	0.840
9	Marlboro	4.797	0.74	6.25	0.00	0.740
10	Lee	4.678	0.73	6.25	0.00	0.728
11	McCormick	4.585	0.72	6.25	0.00	0.718
12	Allendale	3.954	0.65	6.25	0.00	0.653
13	Clarendon	3.118	0.57	6.25	0.00	0.567
14	Hampton	2.939	0.55	6.25	0.00	0.548
15	Newberry	2.742	0.53	6.25	0.00	0.528
16	Calhoun	2.635	0.52	6.25	0.00	0.517
17	Fairfield	2.133	0.46	6.25	0.00	0.465
18	Chesterfield	1.955	0.45	6.25	0.00	0.447
19	Berkeley	1.78	0.43	6.25	0.00	0.428
20	Edgefield	1.657	0.42	6.25	0.00	0.416
21	Bamberg	1.401	0.39	6.25	0.00	0.389
22	Orangeburg	1.131	0.36	6.25	0.00	0.361
23	Barnwell	1.045	0.35	6.25	0.00	0.353
24	Sumter	0.905	0.34	6.25	0.00	0.338
25	Richland	0.435	0.29	6.25	0.00	0.290
26	Williamsburg	0.122	0.26	6.25	0.00	0.257
27	Marion	0.011	0.25	6.25	0.00	0.246
28	Dorchester	-0.072	0.24	6.25	0.00	0.237
29	York	-0.505	0.19	6.25	0.00	0.193
30	Darlington	-0.573	0.19	6.25	0.00	0.186
31	Florence	-0.927	0.15	6.25	0.00	0.149
32	Laurens	-0.961	0.15	6.25	0.00	0.145
33	Abbeville	-1.054	0.14	6.25	0.00	0.136
34	Chester	-1.357	0.10	6.25	0.00	0.105
35	Spartanburg	-2.179	0.02	12.50	0.08	0.103
36	Aiken	-1.372	0.10	6.25	0.00	0.103
37	Greenwood	-1.55	0.08	6.25	0.00	0.085
38	Greenville	-1.646	0.07	6.25	0.00	0.075
39	Lancaster	-1.657	0.07	6.25	0.00	0.074
40	Cherokee	-1.769	0.06	6.25	0.00	0.062
41	Kershaw	-2.036	0.03	6.25	0.00	0.034
42	Lexington	-2.081	0.03	6.25	0.00	0.030
43	Pickens	-2.082	0.03	6.25	0.00	0.030
44	Oconee	-2.27	0.01	6.25	0.00	0.010
45	Anderson	-2.3	0.01	6.25	0.00	0.007
46	Union	-2.37	0.00	6.25	0.00	0.000

5.1.3 Waterspout

Waterspout data represent all recorded events between 1993 and 2008. Historically, coastal counties are the only counties that have experienced this hazard. Horry, Georgetown, and Charleston Counties have the greatest number of historical hazard occurrences. The top choropleth map in Figure 5.5 represents the historical hazard occurrences for this hazard.

The highest Social Vulnerability scores were in Saluda, Dillon, Marlboro, Lee, and McCormick Counties. The middle choropleth map in Figure 5.5 represents the Social Vulnerability scores for the state (see section 3.1).

Charleston County has the greatest Place Vulnerability to waterspout hazards (Figure 5.5). Given the relatively low number of waterspouts, the Place Vulnerability is dominated by the social vulnerability (Table 5.3). Saluda, Dillon, Jasper and Marlboro Counties are in the top five on Place Vulnerability; however, Jasper is the only county to record a waterspout in the time period.

South Carolina has not recorded any waterspouts since 2006. The last reported waterspout was in 2001 off of Folly Beach in Charleston County.

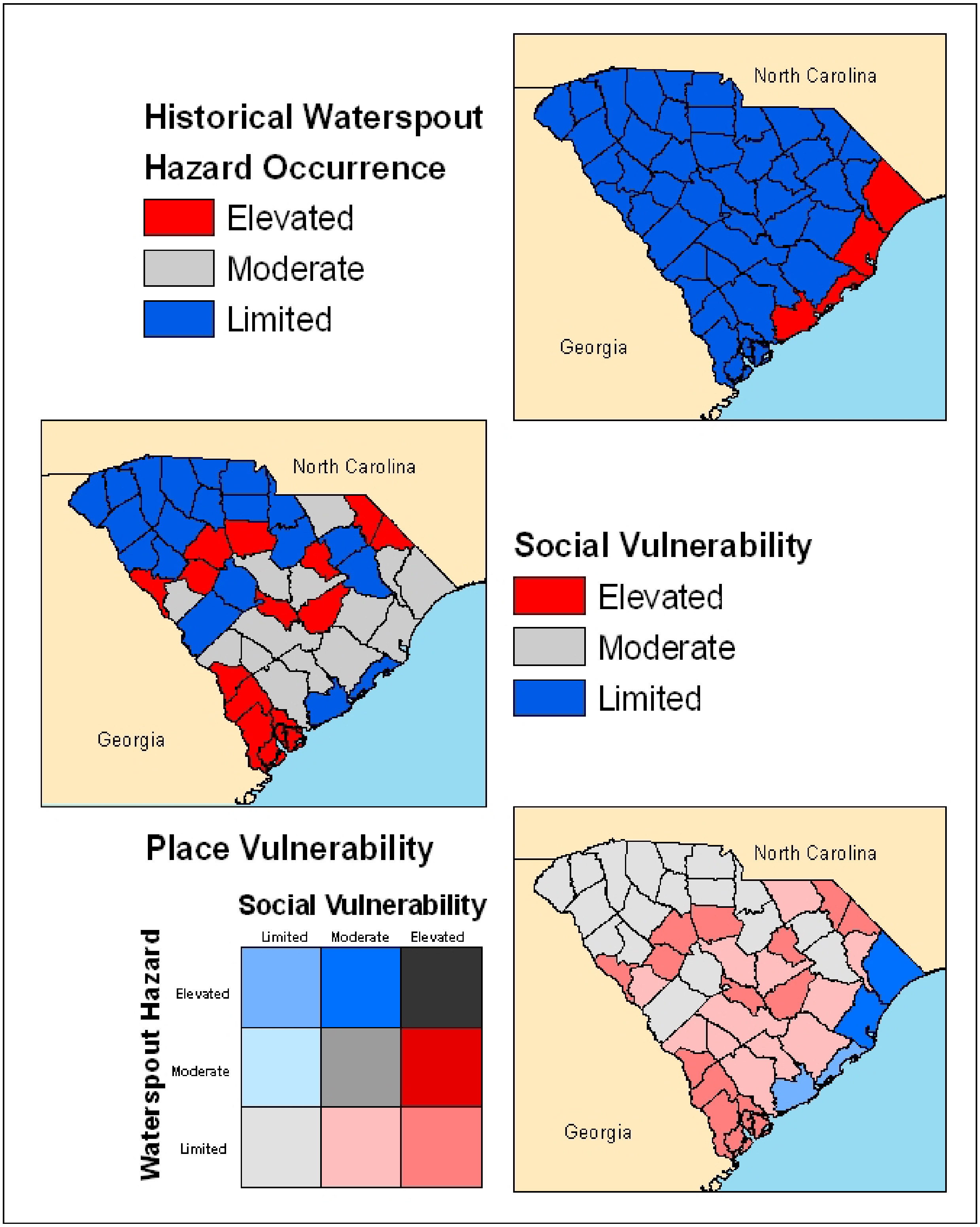

Figure 5.5: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Waterspout Hazard

Table 5.3: Counties Ranked by Place Vulnerability for Waterspout Hazard

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Charleston	-1.265	0.11	106.25	1.00	1.114
2	Saluda	7.315	1.00	0.00	0.00	1.000
3	Dillon	5.769	0.84	0.00	0.00	0.840
4	Jasper	4.565	0.72	6.25	0.06	0.775
5	Marlboro	4.797	0.74	0.00	0.00	0.740
6	Lee	4.678	0.73	0.00	0.00	0.728
7	McCormick	4.585	0.72	0.00	0.00	0.718
8	Georgetown	1.143	0.36	37.50	0.35	0.716
9	Allendale	3.954	0.65	0.00	0.00	0.653
10	Beaufort	2.764	0.53	12.50	0.12	0.648
11	Horry	0.433	0.29	37.50	0.35	0.642
12	Clarendon	3.118	0.57	0.00	0.00	0.567
13	Hampton	2.939	0.55	0.00	0.00	0.548
14	Newberry	2.742	0.53	0.00	0.00	0.528
15	Calhoun	2.635	0.52	0.00	0.00	0.517
16	Fairfield	2.133	0.46	0.00	0.00	0.465
17	Chesterfield	1.955	0.45	0.00	0.00	0.447
18	Berkeley	1.78	0.43	0.00	0.00	0.428
19	Edgefield	1.657	0.42	0.00	0.00	0.416
20	Bamberg	1.401	0.39	0.00	0.00	0.389
21	Orangeburg	1.131	0.36	0.00	0.00	0.361
22	Barnwell	1.045	0.35	0.00	0.00	0.353
23	Colleton	0.393	0.29	6.25	0.06	0.344
24	Sumter	0.905	0.34	0.00	0.00	0.338
25	Richland	0.435	0.29	0.00	0.00	0.290
26	Williamsburg	0.122	0.26	0.00	0.00	0.257
27	Marion	0.011	0.25	0.00	0.00	0.246
28	Dorchester	-0.072	0.24	0.00	0.00	0.237
29	York	-0.505	0.19	0.00	0.00	0.193
30	Darlington	-0.573	0.19	0.00	0.00	0.186
31	Florence	-0.927	0.15	0.00	0.00	0.149
32	Laurens	-0.961	0.15	0.00	0.00	0.145
33	Abbeville	-1.054	0.14	0.00	0.00	0.136
34	Chester	-1.357	0.10	0.00	0.00	0.105
35	Aiken	-1.372	0.10	0.00	0.00	0.103
36	Greenwood	-1.55	0.08	0.00	0.00	0.085
37	Greenville	-1.646	0.07	0.00	0.00	0.075
38	Lancaster	-1.657	0.07	0.00	0.00	0.074
39	Cherokee	-1.769	0.06	0.00	0.00	0.062
40	Kershaw	-2.036	0.03	0.00	0.00	0.034
41	Lexington	-2.081	0.03	0.00	0.00	0.030
42	Pickens	-2.082	0.03	0.00	0.00	0.030
43	Spartanburg	-2.179	0.02	0.00	0.00	0.020
44	Oconee	-2.27	0.01	0.00	0.00	0.010
45	Anderson	-2.3	0.01	0.00	0.00	0.007
46	Union	-2.37	0.00	0.00	0.00	0.000

5.2 Dam Failure

The National Performance of Dams Programs (NPDP) maintains a database of dam incidents (http://npdp.stanford.edu/index.html), however not all dams within the state are included in the database. So this assessment provides a brief analysis of the potential hazard using the classification of dams as high risk. Based on the rating agency, the definitions of high risk vary, but they all reflect those dams that pose the greatest risks for failure or collapse. Using data from the NPDP shows the pattern of high risk dams is concentrated in the Midlands (Aiken, Lexington, and Richland Counties) and in the Upstate (Figure 5.6 top).

State regulated dams provide a similar picture (Figure 5.6 middle). Based on the number of high-hazard ratings from the Department of Health and Environmental Control's (DHEC) assessment of state regulated dams shows the same counties as the NPDP data with the exception of Oconee.

The state also has Federal Energy Regulatory Commission (FERC) dams (Figure 5.6 bottom). These dams facilitate hydroelectric power production and are generally larger than the DHEC-regulated dams. Oconee County has the largest number of high-hazard rated FERC dams (14). Additionally, Barnwell, Berkeley, Cherokee, Chester, Clarendon, Fairfield, Greenville, Kershaw, Lancaster, Lexington, Newberry, Spartanburg, Union, and York counties each have at least one significant FERC rated dam located within them. First priority should be focused on dam hazard preparation in these counties, followed by Pickens County. It should be noted that of the 34 FERC-regulated dams in the State Emergency Response Plan, five had no ratings or specific locations and are thus excluded from this analysis.

Since 1975 South Carolina has experienced 15 dam incidents throughout the state causing 5 deaths and 1 injury, based on the NPDP incident data. The most recent dam incidents occurred on July 24, 2007 on when two dams failed. The Starnes/Brown Dam in Aiken county was breached, allowing for an above normal water flow to continue uninhibited downstream. Water released from the upstream dam (Edisto Lake Dam) combined with water release by the Starnes/Brown Dam failure, traveled downstream and caused overtopping and the breach of the Malcolm B. Rawls Dam. There were no injuries, fatalities, or property loss associated with these dam failures.

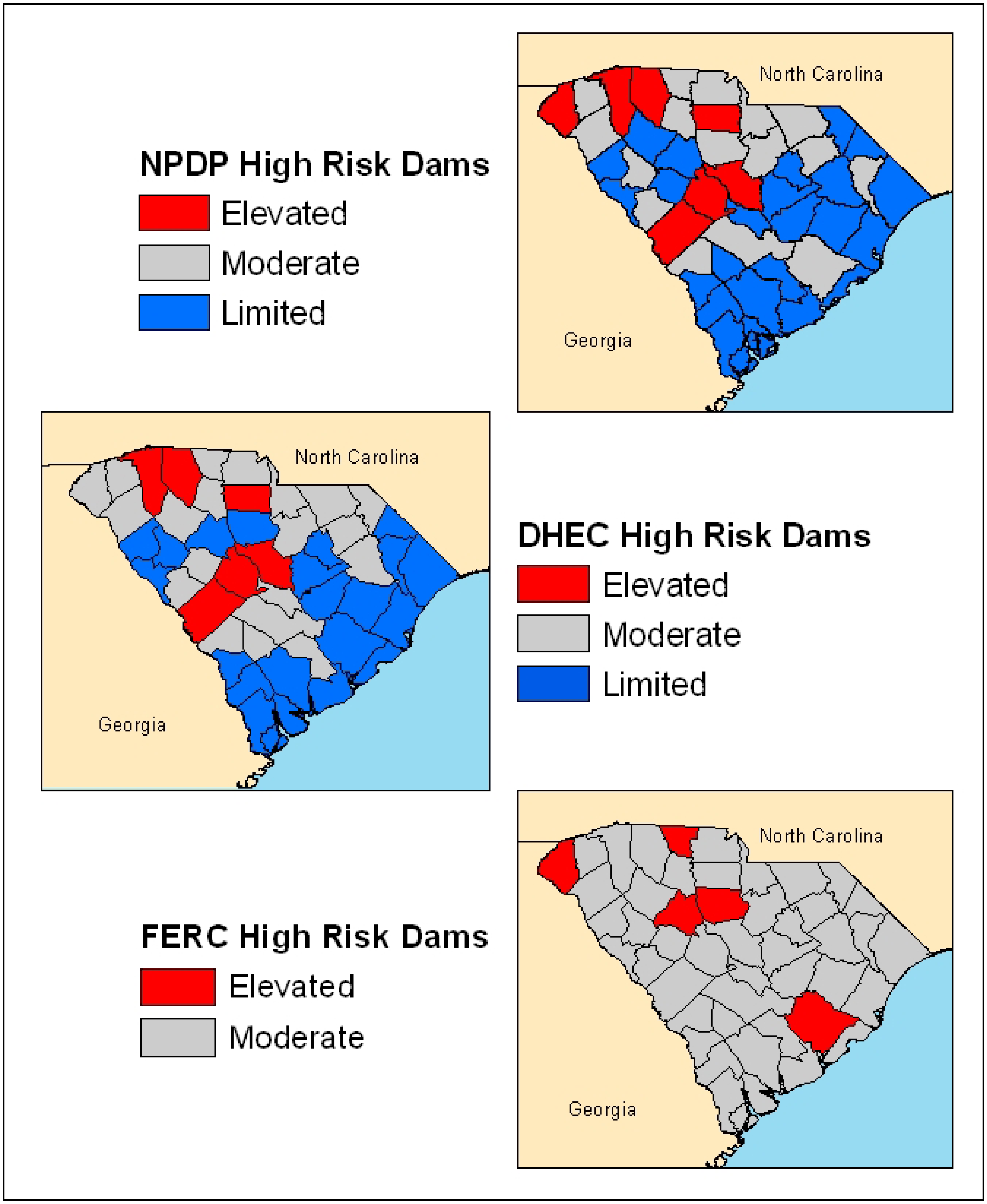

Figure 5.6: High Risk Dams by Assessing Agency

5.3 Drought

Identifying drought hazard areas poses a significant challenge because climatological reporting systems often collect spatial drought related information using different spatial extents than most of the hazards presented within this study. An additional problem is the fact that drought is not simply characterized and/or identified by a singular indicator (lack of precipitation). Conversely, this slow onset hazard is the product of multiple interacting agents including precipitation, soil and crop moisture, and temperature. The science of forecasting future drought conditions is still in its infant stages of development due to the insidious nature of this hazard and the numerous interactive weather related components which define it. In many instances, a drought hazard cannot be identified until the event is already weeks or months underway or has already passed. Different definitions of drought can be found within many of the different sectors of society impacted by it. Examples include:

- Meteorological Drought – the departure of a precipitation level from the climatologic "normal". Meteorological drought is often seen as one of the primary causes of drought.
- Hydrological Drought – deficits in water supplies (surface and subsurface). These deficiencies often reflect effects and impacts of drought
- Agricultural Drought – the lack of sufficient soil moisture to grow a particular crop. Agricultural drought also reflects impacts of drought conditions.

Measuring the severity of drought does not necessarily capture the impacts to lives and livelihoods that drought hazards are having on the population and infrastructure of the state. While the Palmer Drought Severity Index (PDSI) is a commonly used metric for understanding drought severity it is just one of many measure of drought conditions based on water supply and demand (Cutter et al. 1999). Utilizing this metric allows for a course spatial understanding of drought based on seven climate forecast zones within the state of South Carolina. Downscaling PDSI data becomes problematic because the spatial extent of climate forecast zones does not conform to the county boundaries for the state. This is particularly noticeable in the upstate counties of Oconee, Pickens, and Greenville (Figure 5.7.)

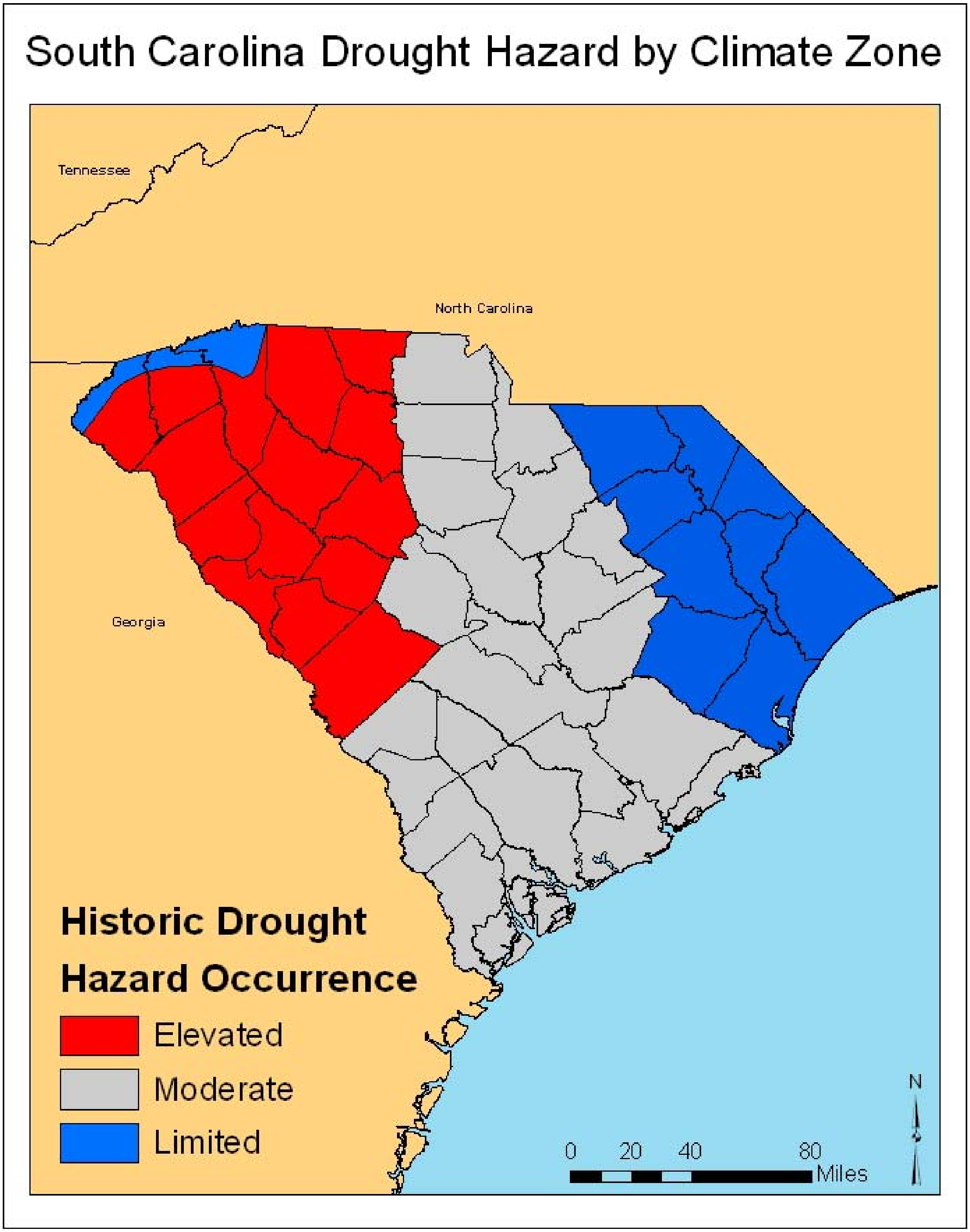

Figure 5.7: Drought Hazard Occurrence by South Carolina Climate Zone

Because PDSI does not truly represent drought impacts to local areas (counties) and issues with downscaling become apparent, this data was not used to calculate drought hazard probability in this report. Rather, event specifics (including temporal components and losses) were aggregated from the National Climatic Data Center's Storm Events Database. Drought events for each county were aggregated by month and year to standardize drought recurrence and probability for input into the larger hazard and place vulnerability measures in this report. Data here represent drought events reported from 1950 – 2008.

Figure 5.8 clearly shows three main geographic areas of drought hazard event occurrence in the state. These "regions" loosely resemble the upstate, midlands, and coastal plain. The regionality of drought hazard provides a baseline from which many different mitigation measures (such as water restrictions, increased water sustainability projects, or cooperative sharing agreements) could prove influential to drought reduction

Elevated drought appears in the Upstate counties, with moderate levels of drought extending from the Pee Dee to the southwest (top map Figure 5.8). Limited drought occurrences occur in the northeast coastal counties as well as throughout the middle portion of the state.

The highest Social Vulnerability scores were in Saluda, Dillon, Marlboro, Lee, and McCormick Counties. The middle choropleth map in Figure 5.8 represents the Social Vulnerability scores for the state (see section 3.1).

Jasper County has the greatest Place Vulnerability to drought hazards (Figure 5.8, bottom), based on the combination of its social vulnerability and frequency of drought. Chester is second, largely as a function of the high frequency of drought (Table 5.4). The remaining top five counties for drought are Allendale, Saluda, and Hampton. Saluda has a limited occurrence of drought hazards, but an elevated social vulnerability, which increases its place vulnerability score for this hazard. Combined with current social vulnerability, a slightly different pattern of place vulnerability to drought emerges. While the upstate has high drought hazard vulnerability, it is the low country (Beaufort, Jasper, and Allendale) as well as Marlboro in northeastern South Carolina that stand out in the lower map. These areas not only have high social vulnerability, but also have historically had a moderate level of drought event impacts.

The period from May 2007 to April 2008 was exceptionally dry with severe to exceptional drought conditions, especially in the Upstate region. Despite above average rainfall for May of 2008, the severe to exceptional drought designation continued from June through November 2008. Since 2006, there are no recorded events and no recorded losses (crop, property, or human injuries or fatalities) for this hazard type.

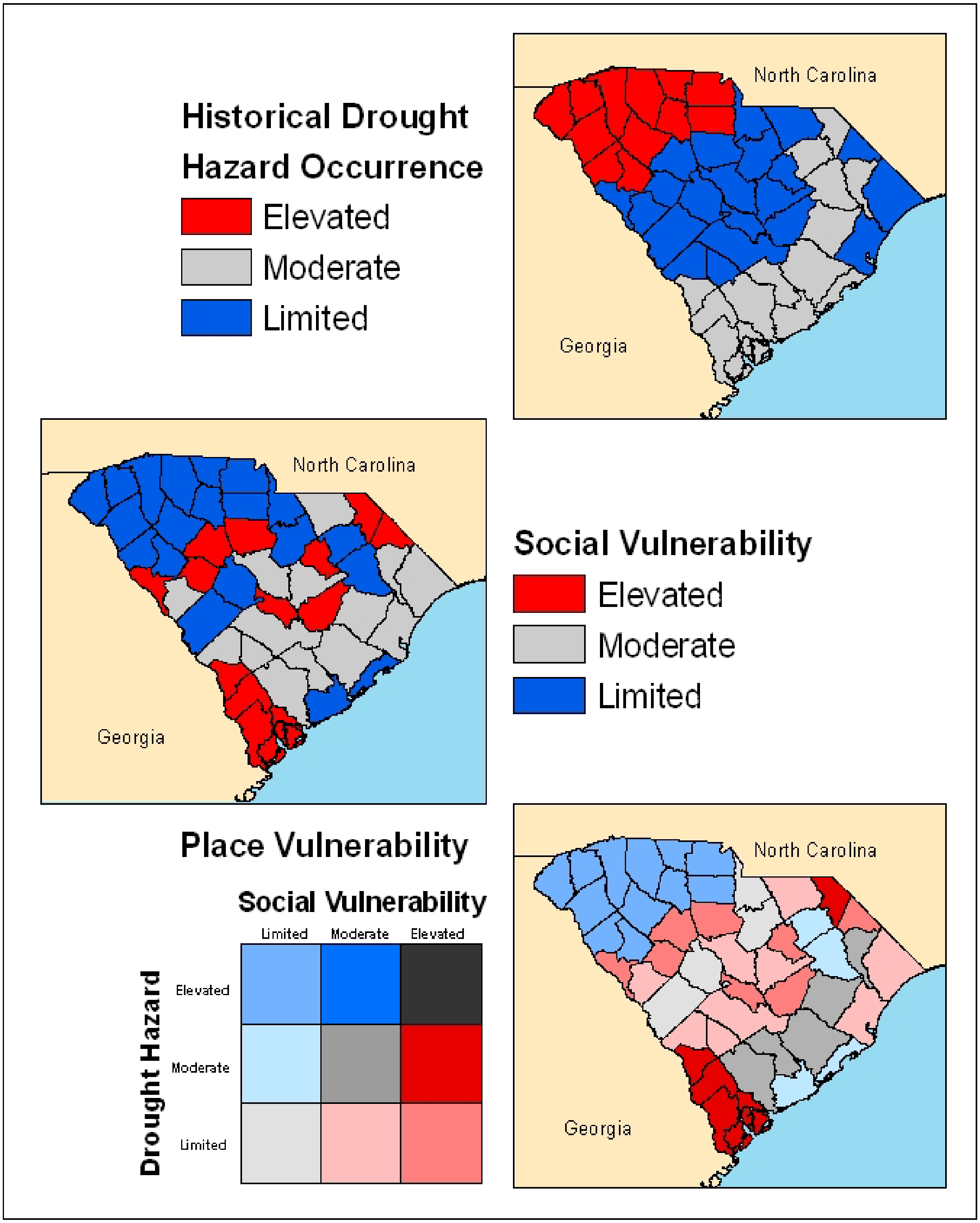

Figure 5.8: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Drought Hazard

Table 5.4: Counties Ranked by Place Vulnerability for Drought Hazard

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Jasper	4.565	0.72	35.59	0.40	1.116
2	Chester	-1.357	0.10	86.44	1.00	1.105
3	Allendale	3.954	0.65	35.59	0.40	1.053
4	Saluda	7.315	1.00	1.69	0.00	1.000
5	Hampton	2.939	0.55	35.59	0.40	0.948
6	Marlboro	4.797	0.74	18.64	0.20	0.940
7	Beaufort	2.764	0.53	35.59	0.40	0.930
8	Dillon	5.769	0.84	6.78	0.06	0.900
9	Berkeley	1.78	0.43	35.59	0.40	0.829
10	York	-0.505	0.19	52.54	0.60	0.793
11	Laurens	-0.961	0.15	55.93	0.64	0.786
12	Abbeville	-1.054	0.14	55.93	0.64	0.776
13	Greenville	-1.646	0.07	57.63	0.66	0.735
14	Lee	4.678	0.73	1.69	0.00	0.728
15	Greenwood	-1.55	0.08	55.93	0.64	0.725
16	McCormick	4.585	0.72	1.69	0.00	0.718
17	Cherokee	-1.769	0.06	55.93	0.64	0.702
18	Colleton	0.393	0.29	35.59	0.40	0.685
19	Pickens	-2.082	0.03	55.93	0.64	0.670
20	Spartanburg	-2.179	0.02	55.93	0.64	0.660
21	Oconee	-2.27	0.01	55.93	0.64	0.650
22	Anderson	-2.3	0.01	55.93	0.64	0.647
23	Union	-2.37	0.00	55.93	0.64	0.640
24	Dorchester	-0.072	0.24	35.59	0.40	0.637
25	Clarendon	3.118	0.57	1.69	0.00	0.567
26	Newberry	2.742	0.53	1.69	0.00	0.528
27	Calhoun	2.635	0.52	1.69	0.00	0.517
28	Charleston	-1.265	0.11	33.90	0.38	0.494
29	Georgetown	1.143	0.36	11.86	0.12	0.483
30	Fairfield	2.133	0.46	1.69	0.00	0.465
31	Chesterfield	1.955	0.45	1.69	0.00	0.447
32	Edgefield	1.657	0.42	1.69	0.00	0.416
33	Horry	0.433	0.29	11.86	0.12	0.409
34	Williamsburg	0.122	0.26	13.56	0.14	0.397
35	Bamberg	1.401	0.39	1.69	0.00	0.389
36	Marion	0.011	0.25	13.56	0.14	0.386
37	Orangeburg	1.131	0.36	1.69	0.00	0.362
38	Barnwell	1.045	0.35	1.69	0.00	0.353
39	Darlington	-0.573	0.19	15.25	0.16	0.346
40	Sumter	0.905	0.34	1.69	0.00	0.338
41	Florence	-0.927	0.15	15.25	0.16	0.309
42	Richland	0.435	0.29	1.69	0.00	0.290
43	Aiken	-1.372	0.10	1.69	0.00	0.103
44	Lancaster	-1.657	0.07	1.69	0.00	0.074
45	Kershaw	-2.036	0.03	1.69	0.00	0.035
46	Lexington	-2.081	0.03	1.69	0.00	0.030

5.4 Flood

Flood data represent all flash, riverine, and urban flooding events between 1950 and 2008. Historically, counties located in the coastal plain and in the upstate generally have higher flood occurrence than those counties located in the midlands. Greenville, Charleston, Spartanburg, Berkeley, and Anderson Counties have the greatest historical occurrence of flood events (Figure 5.9 top).

The middle choropleth map in Figure 5.9 represents the Social Vulnerability scores for the state (see section 3.1).

Greenville has the greatest Place Vulnerability to flood hazards, but Saluda, Charleston, and Dillon Counties also appear at the top of Place Vulnerability (Table 5.5). Since flooding is associated with many hazards including hurricane, tropical storm, summer storms, dam failures, and even occasional snowmelt, a priority for many counties should be on preparing for this hazard. When examined in conjunction with social vulnerability, the impact of flood hazards is somewhat reduced for the Upstate counties, which register lower levels of social vulnerability (Figure 5.9 bottom). In this respect, Beaufort and Jasper with moderate levels of flooding yet elevated levels of social vulnerability combine to produce the higher levels of place vulnerability.

Eighty-nine flood events totaling $424,000 in property and crop damage have occurred in South Carolina since 2006 (NCDC Storm Data Reports Online, 2009). There were three injuries and no deaths attributed to flooding since 2006 in the state. In the recent past, flood events have contributed millions of dollars in damage, however, during this time period, flood losses have remained minimal. Since 2006, there have been four flash flood events causing nearly $50,000 each in property damage. These events occurred in Pickens, Richland, Charleston, and Dorchester Counties. A heavy rain event caused a flash flood on August 24, 2006 near North Charleston, in Charleston County. Emergency management officials reported that a 40 X 40 foot section of roof collapsed at a Goer Industries industrial building. There were three injuries associated with this event (NCDC Storm Data Reports, 2009).

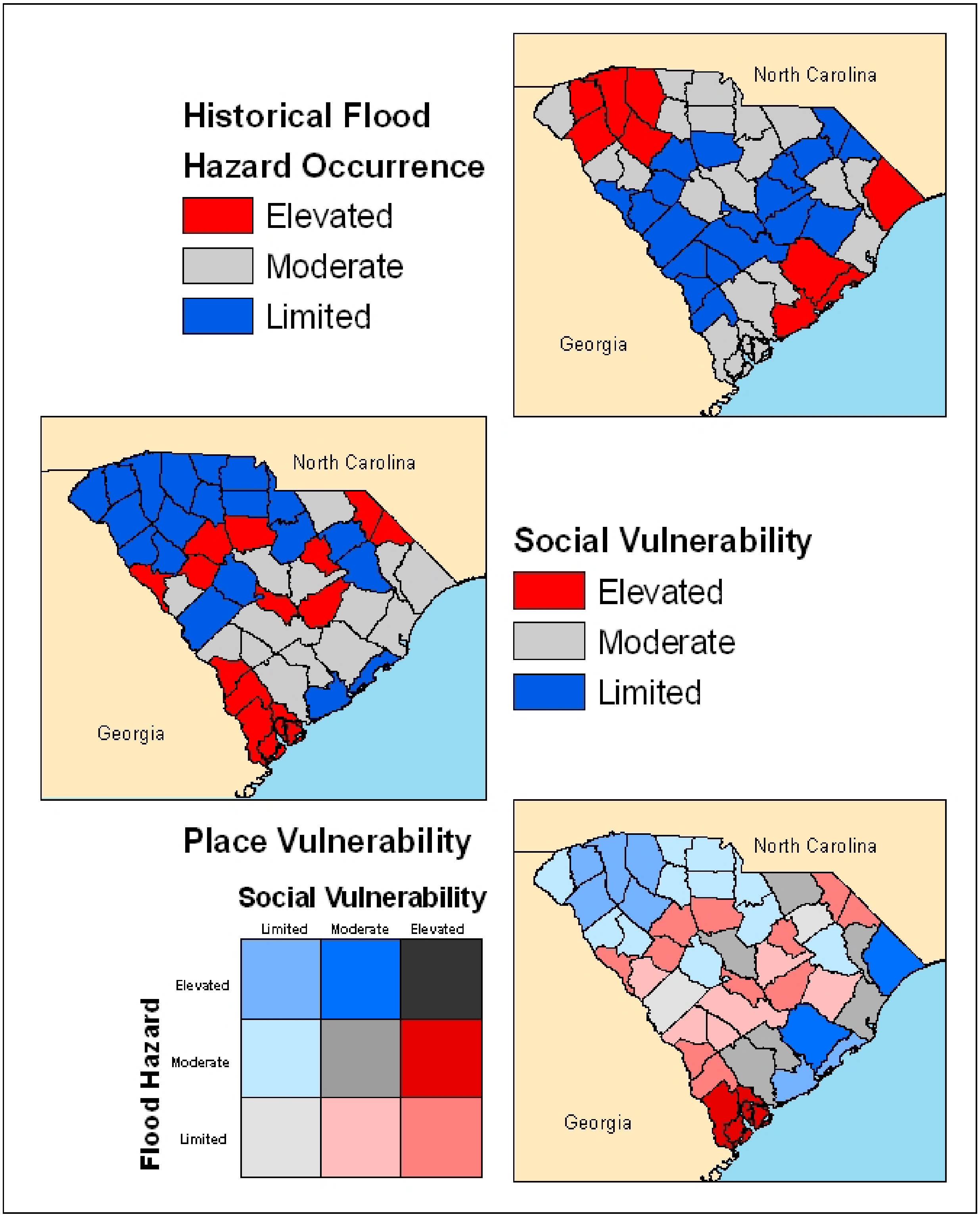

Figure 5.9: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Flood Hazard

Table 5.5: Counties Ranked by Place Vulnerability for Flood Hazard

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Greenville	-1.646	0.07	150.85	1.00	1.075
2	Saluda	7.315	1.00	6.78	0.01	1.012
3	Charleston	-1.265	0.11	130.51	0.86	0.975
4	Dillon	5.769	0.84	10.17	0.03	0.875
5	Berkeley	1.78	0.43	69.49	0.44	0.870
6	Jasper	4.565	0.72	16.95	0.08	0.797
7	Beaufort	2.764	0.53	42.37	0.26	0.786
8	Marlboro	4.797	0.74	10.17	0.03	0.775
9	Lee	4.678	0.73	10.17	0.03	0.763
10	McCormick	4.585	0.72	6.78	0.01	0.730
11	Spartanburg	-2.179	0.02	105.08	0.69	0.706
12	Allendale	3.954	0.65	5.08	0.00	0.653
13	Clarendon	3.118	0.57	13.56	0.06	0.625
14	Horry	0.433	0.29	52.54	0.33	0.615
15	Hampton	2.939	0.55	8.47	0.02	0.571
16	Newberry	2.742	0.53	10.17	0.03	0.563
17	Calhoun	2.635	0.52	10.17	0.03	0.552
18	Chesterfield	1.955	0.45	18.64	0.09	0.540
19	Georgetown	1.143	0.36	28.81	0.16	0.526
20	Richland	0.435	0.29	38.98	0.23	0.522
21	Fairfield	2.133	0.46	5.08	0.00	0.465
22	Dorchester	-0.072	0.24	37.29	0.22	0.458
23	Pickens	-2.082	0.03	66.10	0.42	0.448
24	Laurens	-0.961	0.15	49.15	0.30	0.448
25	Anderson	-2.3	0.01	67.80	0.43	0.437
26	Bamberg	1.401	0.39	11.86	0.05	0.436
27	Orangeburg	1.131	0.36	13.56	0.06	0.420
28	Edgefield	1.657	0.42	5.08	0.00	0.416
29	Colleton	0.393	0.29	23.73	0.13	0.413
30	Barnwell	1.045	0.35	11.86	0.05	0.399
31	Sumter	0.905	0.34	10.17	0.03	0.373
32	York	-0.505	0.19	28.81	0.16	0.355
33	Marion	0.011	0.25	15.25	0.07	0.316
34	Williamsburg	0.122	0.26	8.47	0.02	0.281
35	Chester	-1.357	0.10	30.51	0.17	0.279
36	Florence	-0.927	0.15	22.03	0.12	0.265
37	Abbeville	-1.054	0.14	23.73	0.13	0.264
38	Greenwood	-1.55	0.08	28.81	0.16	0.247
39	Oconee	-2.27	0.01	37.29	0.22	0.231
40	Cherokee	-1.769	0.06	28.81	0.16	0.225
41	Darlington	-0.573	0.19	10.17	0.03	0.220
42	Union	-2.37	0.00	35.59	0.21	0.209
43	Lexington	-2.081	0.03	28.81	0.16	0.193
44	Lancaster	-1.657	0.07	16.95	0.08	0.155
45	Aiken	-1.372	0.10	10.17	0.03	0.138
46	Kershaw	-2.036	0.03	15.25	0.07	0.104

5.5 Fog

Fog data from NCDC represents all recorded events between 1997 and 2008. Fog events have a relatively shorter period of record compared to other events because NCDC began tracking fog events in 1997. Historically, counties in the upstate have experienced elevated levels of fog hazards. Greenville, Pickens, Oconee, Anderson, and Cherokee Counties have the greatest number of historical hazard occurrences within the state (Figure 5.10 top).

The middle choropleth map in Figure 5.10 represents the Social Vulnerability scores for the state (see section 3.1).

Greenville County has the greatest Place Vulnerability to fog hazards (Table 5.6). Pickens, Saluda, Oconee, and Dillon Counties also have a high Place Vulnerability. Saluda and Dillon Counties have not experienced any fog hazards, but their extremely high SoVI score is reflected in the Place Vulnerability score. While the fog hazard is greatest in the Upstate, the lower social vulnerability reduces the overall place vulnerability (elevated hazard, but limited social vulnerability). There are no counties with moderate to elevated levels of social vulnerability and moderate to elevated levels of fog hazards.

There has not been a fog event recorded since 2006. In 2001, Horry County experienced a 12 vehicle crash, killing one man and injuring ten others. The accident was caused by dense fog, and caused $15,000 in property damage. On July 1, 2002, heavy fog caused two accidents near Florence. The first accident occurred when an 18 wheeler collided head-on with another vehicle. Two other automobiles were involved. The second accident occurred when a cement truck rear ended another truck, causing three injuries. Overall, $20,000 in property damage occurred.

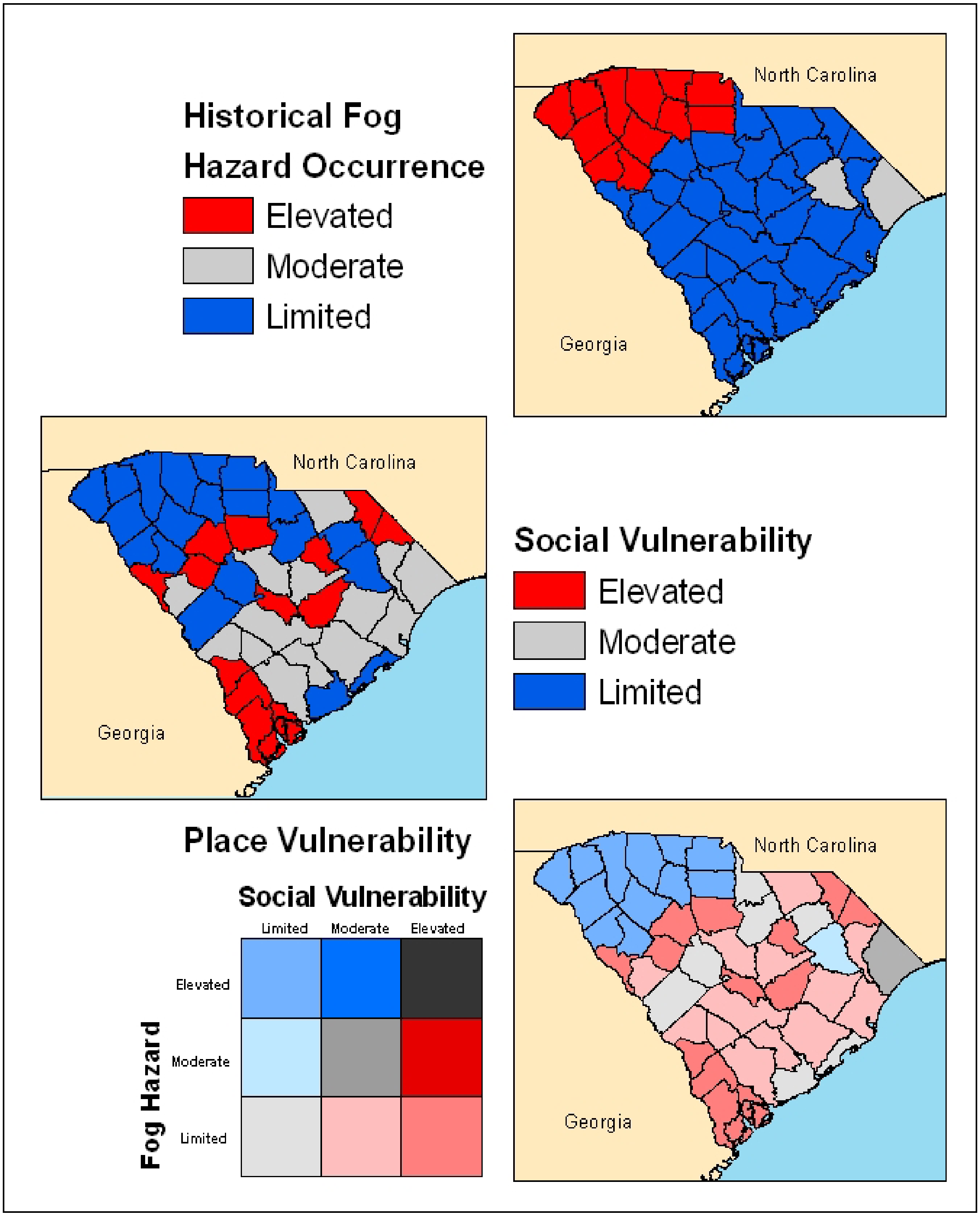

Figure 5.10: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Fog Hazard

Table 5.6: Counties Ranked by Place Vulnerability for Fog Hazard

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Greenville	-1.646	0.07	50.00	1.00	1.075
2	Pickens	-2.082	0.03	50.00	1.00	1.030
3	Saluda	7.315	1.00	0.00	0.00	1.000
4	Oconee	-2.27	0.01	41.67	0.83	0.844
5	Dillon	5.769	0.84	0.00	0.00	0.840
6	Greenwood	-1.55	0.08	33.33	0.67	0.751
7	Marlboro	4.797	0.74	0.00	0.00	0.740
8	Cherokee	-1.769	0.06	33.33	0.67	0.729
9	Lee	4.678	0.73	0.00	0.00	0.728
10	McCormick	4.585	0.72	0.00	0.00	0.718
11	Jasper	4.565	0.72	0.00	0.00	0.716
12	York	-0.505	0.19	25.00	0.50	0.693
13	Spartanburg	-2.179	0.02	33.33	0.67	0.686
14	Anderson	-2.3	0.01	33.33	0.67	0.674
15	Allendale	3.954	0.65	0.00	0.00	0.653
16	Laurens	-0.961	0.15	25.00	0.50	0.645
17	Abbeville	-1.054	0.14	25.00	0.50	0.636
18	Chester	-1.357	0.10	25.00	0.50	0.605
19	Clarendon	3.118	0.57	0.00	0.00	0.567
20	Hampton	2.939	0.55	0.00	0.00	0.548
21	Beaufort	2.764	0.53	0.00	0.00	0.530
22	Newberry	2.742	0.53	0.00	0.00	0.528
23	Calhoun	2.635	0.52	0.00	0.00	0.517
24	Union	-2.37	0.00	25.00	0.50	0.500
25	Fairfield	2.133	0.46	0.00	0.00	0.465
26	Horry	0.433	0.29	8.33	0.17	0.456
27	Chesterfield	1.955	0.45	0.00	0.00	0.447
28	Berkeley	1.78	0.43	0.00	0.00	0.428
29	Edgefield	1.657	0.42	0.00	0.00	0.416
30	Bamberg	1.401	0.39	0.00	0.00	0.389
31	Georgetown	1.143	0.36	0.00	0.00	0.363
32	Orangeburg	1.131	0.36	0.00	0.00	0.361
33	Barnwell	1.045	0.35	0.00	0.00	0.353
34	Sumter	0.905	0.34	0.00	0.00	0.338
35	Florence	-0.927	0.15	8.33	0.17	0.316
36	Richland	0.435	0.29	0.00	0.00	0.290
37	Colleton	0.393	0.29	0.00	0.00	0.285
38	Williamsburg	0.122	0.26	0.00	0.00	0.257
39	Marion	0.011	0.25	0.00	0.00	0.246
40	Dorchester	-0.072	0.24	0.00	0.00	0.237
41	Darlington	-0.573	0.19	0.00	0.00	0.186
42	Charleston	-1.265	0.11	0.00	0.00	0.114
43	Aiken	-1.372	0.10	0.00	0.00	0.103
44	Lancaster	-1.657	0.07	0.00	0.00	0.074
45	Kershaw	-2.036	0.03	0.00	0.00	0.034
46	Lexington	-2.081	0.03	0.00	0.00	0.030

5.6 Geophysical Events

Geophysical events arise from natural processes affecting the earth's landmasses. For example, energy releases in the earth's crust (called tectonic forces) lead to earthquakes and volcanic eruptions. Other geophysical events arise from failures in earth materials such as landslides and avalanches.

5.6.1 Avalanche

The only reported avalanche was March 1, 1980 when heavy snow across the state caused an avalanche in Laurens County, killing one person and causing over $1,000 in property damage. There were no injuries associated with this event. Laurens County has an elevated occurrence of avalanches due to this singular event (Figure 5.11 top). The place vulnerability score for avalanches also shows Laurens County as the highest (Table 5.7). When examining the relationship between hazards occurrence and social vulnerability (Figure 5.11 bottom), Laurens falls in the elevated hazard, but limited social vulnerability category.

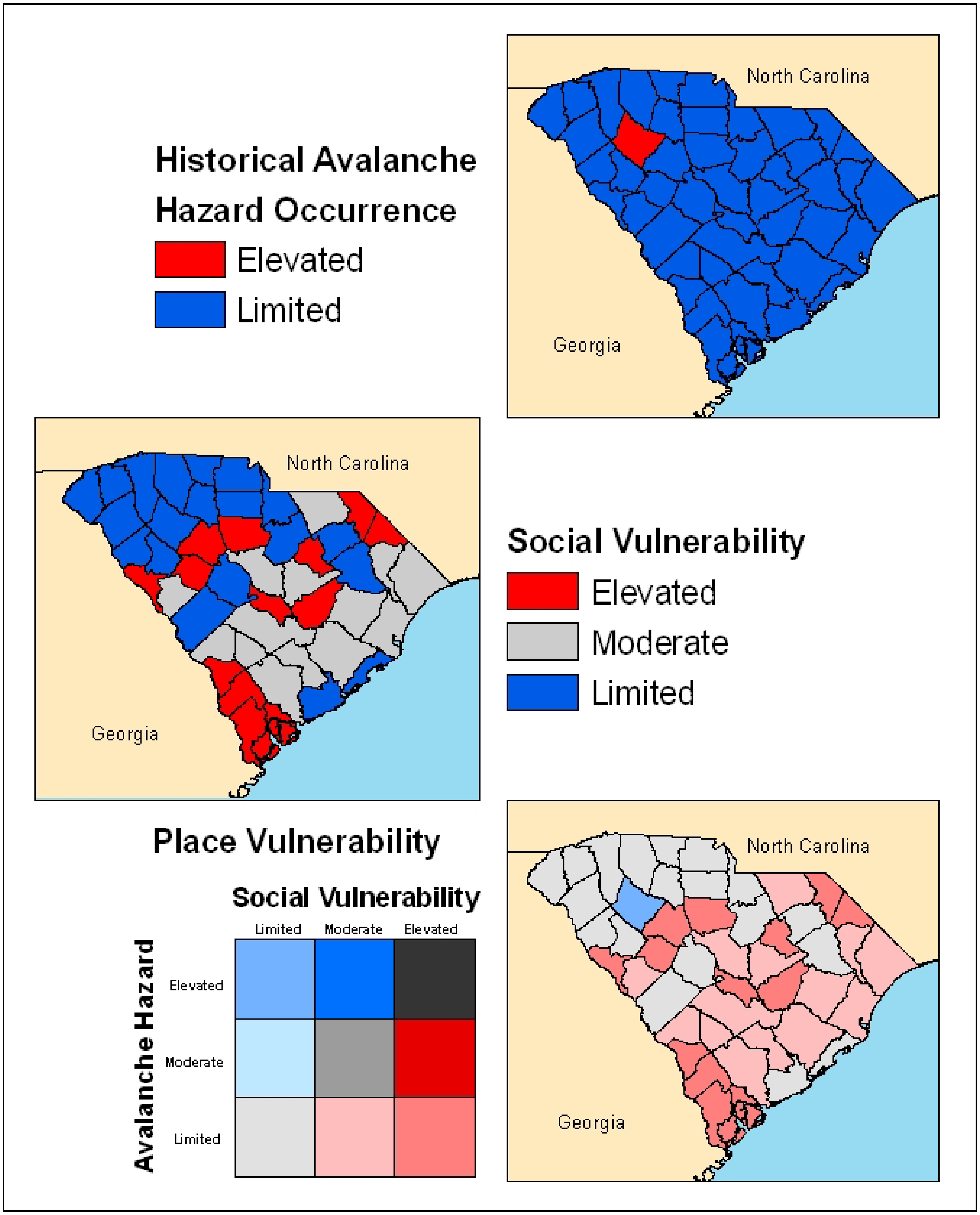

Figure 5.11: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Avalanche Hazard

Table 5.7: Counties Ranked by Place Vulnerability for Avalanche Hazard

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Laurens	-0.961	0.15	2.04	1.00	1.146
2	Saluda	7.315	1.00	0.00	0.00	1.000
3	Dillon	5.769	0.84	0.00	0.00	0.840
4	Marlboro	4.797	0.74	0.00	0.00	0.740
5	Lee	4.678	0.73	0.00	0.00	0.728
6	McCormick	4.585	0.72	0.00	0.00	0.718
7	Jasper	4.565	0.72	0.00	0.00	0.716
8	Allendale	3.954	0.65	0.00	0.00	0.653
9	Clarendon	3.118	0.57	0.00	0.00	0.567
10	Hampton	2.939	0.55	0.00	0.00	0.548
11	Beaufort	2.764	0.53	0.00	0.00	0.530
12	Newberry	2.742	0.53	0.00	0.00	0.528
13	Calhoun	2.635	0.52	0.00	0.00	0.517
14	Fairfield	2.133	0.46	0.00	0.00	0.465
15	Chesterfield	1.955	0.45	0.00	0.00	0.447
16	Berkeley	1.78	0.43	0.00	0.00	0.428
17	Edgefield	1.657	0.42	0.00	0.00	0.416
18	Bamberg	1.401	0.39	0.00	0.00	0.389
19	Georgetown	1.143	0.36	0.00	0.00	0.363
20	Orangeburg	1.131	0.36	0.00	0.00	0.361
21	Barnwell	1.045	0.35	0.00	0.00	0.353
22	Sumter	0.905	0.34	0.00	0.00	0.338
23	Richland	0.435	0.29	0.00	0.00	0.290
24	Horry	0.433	0.29	0.00	0.00	0.289
25	Colleton	0.393	0.29	0.00	0.00	0.285
26	Williamsburg	0.122	0.26	0.00	0.00	0.257
27	Marion	0.011	0.25	0.00	0.00	0.246
28	Dorchester	-0.072	0.24	0.00	0.00	0.237
29	York	-0.505	0.19	0.00	0.00	0.193
30	Darlington	-0.573	0.19	0.00	0.00	0.186
31	Florence	-0.927	0.15	0.00	0.00	0.149
32	Abbeville	-1.054	0.14	0.00	0.00	0.136
33	Charleston	-1.265	0.11	0.00	0.00	0.114
34	Chester	-1.357	0.10	0.00	0.00	0.105
35	Aiken	-1.372	0.10	0.00	0.00	0.103
36	Greenwood	-1.55	0.08	0.00	0.00	0.085
37	Greenville	-1.646	0.07	0.00	0.00	0.075
38	Lancaster	-1.657	0.07	0.00	0.00	0.074
39	Cherokee	-1.769	0.06	0.00	0.00	0.062
40	Kershaw	-2.036	0.03	0.00	0.00	0.034
41	Lexington	-2.081	0.03	0.00	0.00	0.030
42	Pickens	-2.082	0.03	0.00	0.00	0.030
43	Spartanburg	-2.179	0.02	0.00	0.00	0.020
44	Oconee	-2.27	0.01	0.00	0.00	0.010
45	Anderson	-2.3	0.01	0.00	0.00	0.007
46	Union	-2.37	0.00	0.00	0.00	0.000

5.6.2 Earthquake

Earthquake data is represented by the number of recorded epicenters reported per county between 1698 and 2008. Based on the frequency of recorded earthquake epicenters, Fairfield and Berkeley Counties have the highest annual frequency of earthquakes recording 555 and 540 events, respectively during the past 311 years (Figure 5.12). Fairfield and Berkeley counties are in the elevated category for earthquake occurrence (Figure 5.13 top). Dorchester was the only county in the moderate category with 192 events during the recorded time period.

The highest Social Vulnerability scores were in Saluda, Dillon, Marlboro, Lee, and McCormick Counties. The middle choropleth map in Figure 5.13 represents the Social Vulnerability scores for the state (see section 3.1).

Berkeley and Fairfield have the highest place vulnerability score (Table 5.8). Charleston, which also has seismic hazards, ranks fifth in the hazard frequency of occurrence. However, it is understood that if an earthquake of the magnitude experienced in the 1886 Charleston quake reoccurs, damages would be catastrophic for a number of South Carolina counties, especially Charleston. South Carolina Emergency Management Division's *Comprehensive Seismic Risk and Vulnerability Study for the State of South Carolina* (2001) provides a complete overview of the seismic risks within the state. When the earthquake hazard is examined in tandem with the social vulnerability, Fairfield County remains in the elevated category for both hazard occurrence and social vulnerability (Figure 5.13 bottom). Priority for planning and mitigation should be directed toward Fairfield County. Berkeley County shows an elevated hazard score but overall vulnerability is reduced because of the moderate level of social vulnerability. Dorchester County has both a moderate level of earthquake hazards coupled with moderate levels of social vulnerability (Figure 5.13 bottom).

There have been more than eight minimal earthquakes in South Carolina since 2006. None of these events caused any significant damage and many were not even strong enough to be felt by people. There have been no significant earthquakes during this same time period. The counties that have had the greatest number of earthquakes from 2006-2008 were Richland and Marlboro Counties with two earthquakes each. Dorchester, Berkeley, Aiken and Union Counties each recorded one earthquake (South Carolina Seismic Network, 2008).

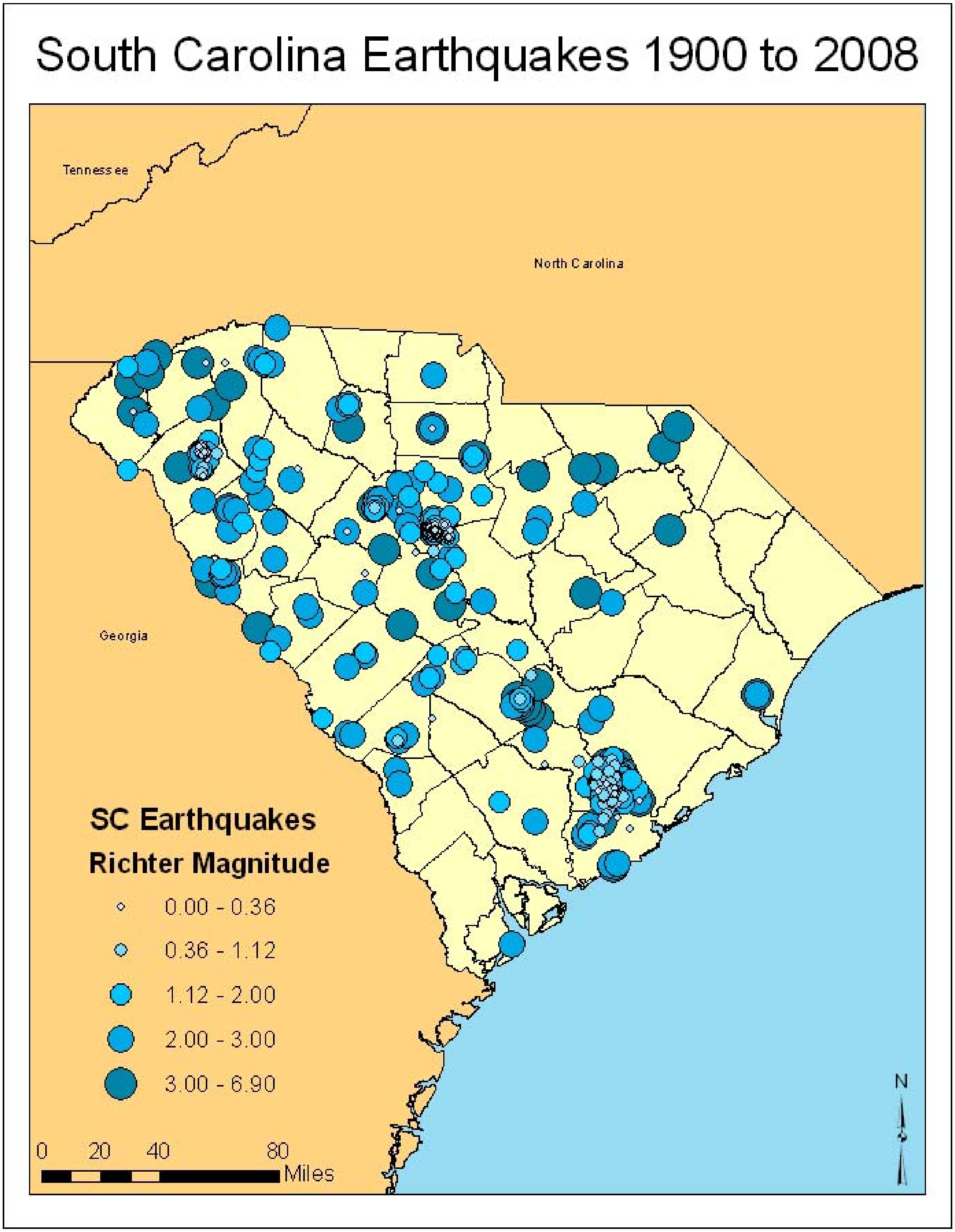

Figure 5.12: South Carolina Earthquake Locations and Magnitudes from 1900-2008

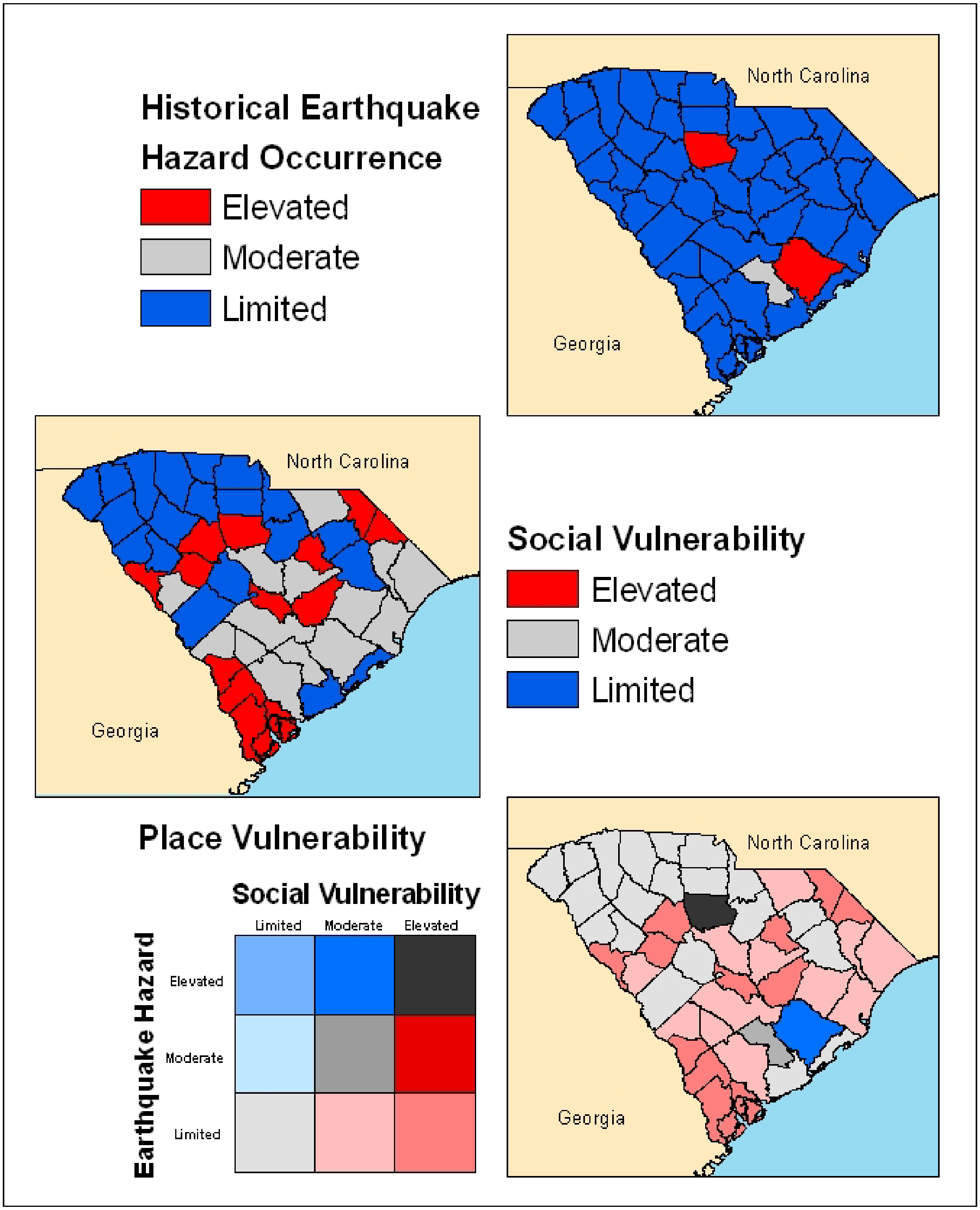

Figure 5.13: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Earthquake Hazard

Table 5.8: Counties Ranked by Place Vulnerability for Earthquake Hazard

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Fairfield	2.133	0.46	179.03	1.00	1.465
2	Berkeley	1.78	0.43	174.19	0.97	1.401
3	Saluda	7.315	1.00	0.65	0.00	1.004
4	Dillon	5.769	0.84	0.00	0.00	0.840
5	Marlboro	4.797	0.74	0.65	0.00	0.744
6	Lee	4.678	0.73	0.32	0.00	0.730
7	McCormick	4.585	0.72	0.00	0.00	0.718
8	Jasper	4.565	0.72	0.00	0.00	0.716
9	Allendale	3.954	0.65	0.65	0.00	0.657
10	Dorchester	-0.072	0.24	61.94	0.35	0.583
11	Clarendon	3.118	0.57	0.32	0.00	0.568
12	Newberry	2.742	0.53	6.77	0.04	0.566
13	Hampton	2.939	0.55	0.00	0.00	0.548
14	Beaufort	2.764	0.53	0.32	0.00	0.532
15	Calhoun	2.635	0.52	0.65	0.00	0.520
16	Chesterfield	1.955	0.45	0.65	0.00	0.450
17	Edgefield	1.657	0.42	0.97	0.01	0.421
18	Orangeburg	1.131	0.36	6.45	0.04	0.398
19	Bamberg	1.401	0.39	0.97	0.01	0.395
20	Georgetown	1.143	0.36	0.65	0.00	0.366
21	Barnwell	1.045	0.35	1.94	0.01	0.363
22	Sumter	0.905	0.34	0.32	0.00	0.340
23	Richland	0.435	0.29	5.81	0.03	0.322
24	Horry	0.433	0.29	0.00	0.00	0.289
25	Colleton	0.393	0.29	0.65	0.00	0.289
26	Marion	0.011	0.25	2.90	0.02	0.262
27	Williamsburg	0.122	0.26	0.00	0.00	0.257
28	York	-0.505	0.19	0.32	0.00	0.194
29	Darlington	-0.573	0.19	0.00	0.00	0.186
30	Charleston	-1.265	0.11	10.97	0.06	0.175
31	Abbeville	-1.054	0.14	3.87	0.02	0.158
32	Laurens	-0.961	0.15	1.94	0.01	0.156
33	Florence	-0.927	0.15	0.32	0.00	0.151
34	Chester	-1.357	0.10	2.26	0.01	0.117
35	Aiken	-1.372	0.10	1.94	0.01	0.114
36	Anderson	-2.3	0.01	14.84	0.08	0.090
37	Greenwood	-1.55	0.08	0.97	0.01	0.090
38	Greenville	-1.646	0.07	2.26	0.01	0.087
39	Lancaster	-1.657	0.07	0.00	0.00	0.074
40	Cherokee	-1.769	0.06	0.00	0.00	0.062
41	Lexington	-2.081	0.03	1.94	0.01	0.041
42	Kershaw	-2.036	0.03	0.97	0.01	0.040
43	Pickens	-2.082	0.03	1.61	0.01	0.039
44	Oconee	-2.27	0.01	4.19	0.02	0.034
45	Spartanburg	-2.179	0.02	1.29	0.01	0.027
46	Union	-2.37	0.00	1.29	0.01	0.007

5.6.3 Landslide

Landslides are infrequent events in the state (Table 5.9). The only reported incident was March 13, 1965 when excess rainfall causes caused a retaining wall to cave in Columbia within Richland County trapping several workers (Figure 5.14 top). All seven workers were killed; however there were no recorded property damages. There have been no recorded landslides in South Carolina since 2006. The place vulnerability for landslide hazards shows a moderate level of hazard and moderate social vulnerability for Richland County. The remaining counties have limited landslide hazards and social vulnerability ranging from limited to elevated (Figure 5.14 bottom).

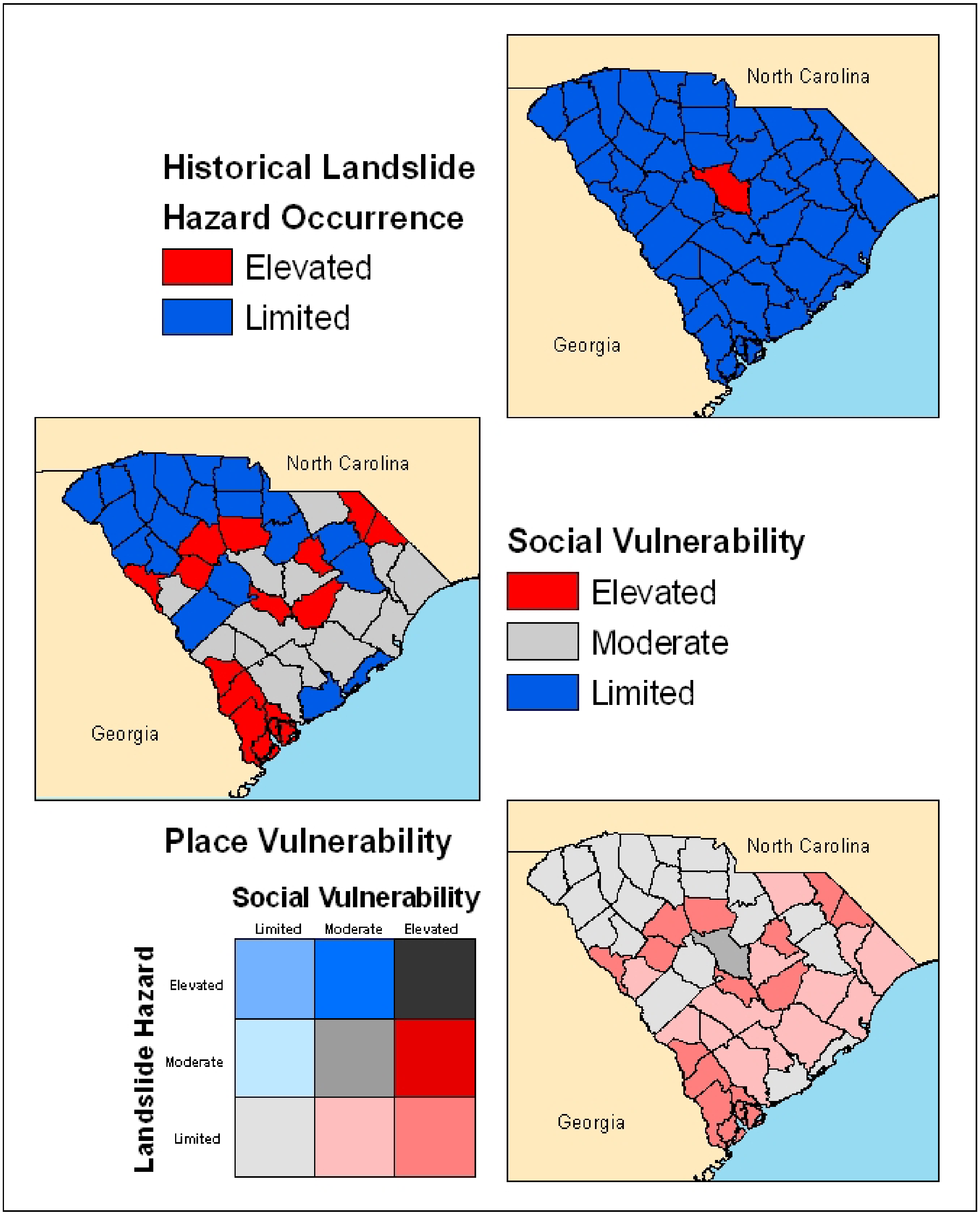

Figure 5.14: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Landslide Hazard

Table 5.9: Counties Ranked by Place Vulnerability for Landslide Hazard

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Richland	0.435	0.29	2.04	1.00	1.290
2	Saluda	7.315	1.00	0.00	0.00	1.000
3	Dillon	5.769	0.84	0.00	0.00	0.840
4	Marlboro	4.797	0.74	0.00	0.00	0.740
5	Lee	4.678	0.73	0.00	0.00	0.728
6	McCormick	4.585	0.72	0.00	0.00	0.718
7	Jasper	4.565	0.72	0.00	0.00	0.716
8	Allendale	3.954	0.65	0.00	0.00	0.653
9	Clarendon	3.118	0.57	0.00	0.00	0.567
10	Hampton	2.939	0.55	0.00	0.00	0.548
11	Beaufort	2.764	0.53	0.00	0.00	0.530
12	Newberry	2.742	0.53	0.00	0.00	0.528
13	Calhoun	2.635	0.52	0.00	0.00	0.517
14	Fairfield	2.133	0.46	0.00	0.00	0.465
15	Chesterfield	1.955	0.45	0.00	0.00	0.447
16	Berkeley	1.78	0.43	0.00	0.00	0.428
17	Edgefield	1.657	0.42	0.00	0.00	0.416
18	Bamberg	1.401	0.39	0.00	0.00	0.389
19	Georgetown	1.143	0.36	0.00	0.00	0.363
20	Orangeburg	1.131	0.36	0.00	0.00	0.361
21	Barnwell	1.045	0.35	0.00	0.00	0.353
22	Sumter	0.905	0.34	0.00	0.00	0.338
23	Horry	0.433	0.29	0.00	0.00	0.289
24	Colleton	0.393	0.29	0.00	0.00	0.285
25	Williamsburg	0.122	0.26	0.00	0.00	0.257
26	Marion	0.011	0.25	0.00	0.00	0.246
27	Dorchester	-0.072	0.24	0.00	0.00	0.237
28	York	-0.505	0.19	0.00	0.00	0.193
29	Darlington	-0.573	0.19	0.00	0.00	0.186
30	Florence	-0.927	0.15	0.00	0.00	0.149
31	Laurens	-0.961	0.15	0.00	0.00	0.145
32	Abbeville	-1.054	0.14	0.00	0.00	0.136
33	Charleston	-1.265	0.11	0.00	0.00	0.114
34	Chester	-1.357	0.10	0.00	0.00	0.105
35	Aiken	-1.372	0.10	0.00	0.00	0.103
36	Greenwood	-1.55	0.08	0.00	0.00	0.085
37	Greenville	-1.646	0.07	0.00	0.00	0.075
38	Lancaster	-1.657	0.07	0.00	0.00	0.074
39	Cherokee	-1.769	0.06	0.00	0.00	0.062
40	Kershaw	-2.036	0.03	0.00	0.00	0.034
41	Lexington	-2.081	0.03	0.00	0.00	0.030
42	Pickens	-2.082	0.03	0.00	0.00	0.030
43	Spartanburg	-2.179	0.02	0.00	0.00	0.020
44	Oconee	-2.27	0.01	0.00	0.00	0.010
45	Anderson	-2.3	0.01	0.00	0.00	0.007
46	Union	-2.37	0.00	0.00	0.00	0.000

5.7 Human-Induced Events

Human-induced hazards arise from human activities and can be accidental (such as hazardous materials releases, or nuclear power plant accidents) or willful acts (such as terrorism or civil disturbances). The recording of events from human-induced causes is difficult, especially for willful acts. Due to security concerns, information about these incidences is not made public. The data presented here are from publically available sources and may underestimate the frequency of human-induced events on the state.

5.7.1 Civil Disturbance

There are no data reported for this hazard in South Carolina.

5.7.2 Hazardous Materials (HAZMAT)

Data analyzed represent the number of hazardous materials spills reported to the National Emergency Response Notification System (ERNS). These spills include those from fixed facilities and transportation sources by county between 1987 and 2008. Figure 5.15 represents the major transportation nodes and lines within the state. Charleston County was the only county with the frequency of occurrence score represented in the elevated category (Figure 5.16 top). Charleston County had a reported 2,685 spills in twenty-one years, or 28% of the state's total. Second to Charleston was Greenville County with 489 reported HAZMAT spills during 1987-2008, followed by Spartanburg (474), and Berkeley (440).

The highest Social Vulnerability scores were in Saluda, Dillon, Marlboro, Lee, and McCormick Counties. The middle choropleth map in Figure 5.16 represents the Social Vulnerability scores for the state (see section 3.1).

Charleston County has the highest Place Vulnerability score for hazardous materials spills (Table 5.10), given its role as a major transportation hub (port, rail, highway) for the state (Figure 5.15). However, the impact of this high hazard score is offset by the relatively low social vulnerability of the county (Figure 5.16 bottom). Other counties with moderate levels of hazmat hazards include Beaufort, Berkeley, Horry, Greenville and Spartanburg Counties. When examined in conjunction with social vulnerability (Figure 5.16 bottom), Berkeley and Horry are classified as moderate on both (grey); Beaufort is in the moderate hazard, elevated social vulnerability class (red), and Greenville and Spartanburg are in the moderate hazard, limited social vulnerability (light blue) category.

There have been 1,187 reported HAZMAT incidents in South Carolina since 2006. Two counties have had more than one hundred HAZMAT release incidents during this time period: Charleston (376) and Richland (112). Marion County has not recorded any hazardous material incidents since 2006.

The most significant of hazardous material release in the state was the Graniteville train derailment and subsequent chlorine release that occurred on January 6, 2005. This event occurred when a Norfolk Southern freight train with 42 cars struck a train with one locomotive and two cars at an Avondale Mills textile facility at about 2:40 a.m. A total of sixteen cars derailed, three of which were carrying ninety tons of chlorine each. One of the derailed tanker cars ruptured and leaked chlorine gas for most of the day. This incident caused nine fatalities, 250 people were treated at local hospitals, and a mandatory evacuation forced the displacement of about 5,400 of the areas' 7,000 residents. A complete report on the accident and an evaluation of the evacuation can be found in Mitchell *et al.*, 2005.

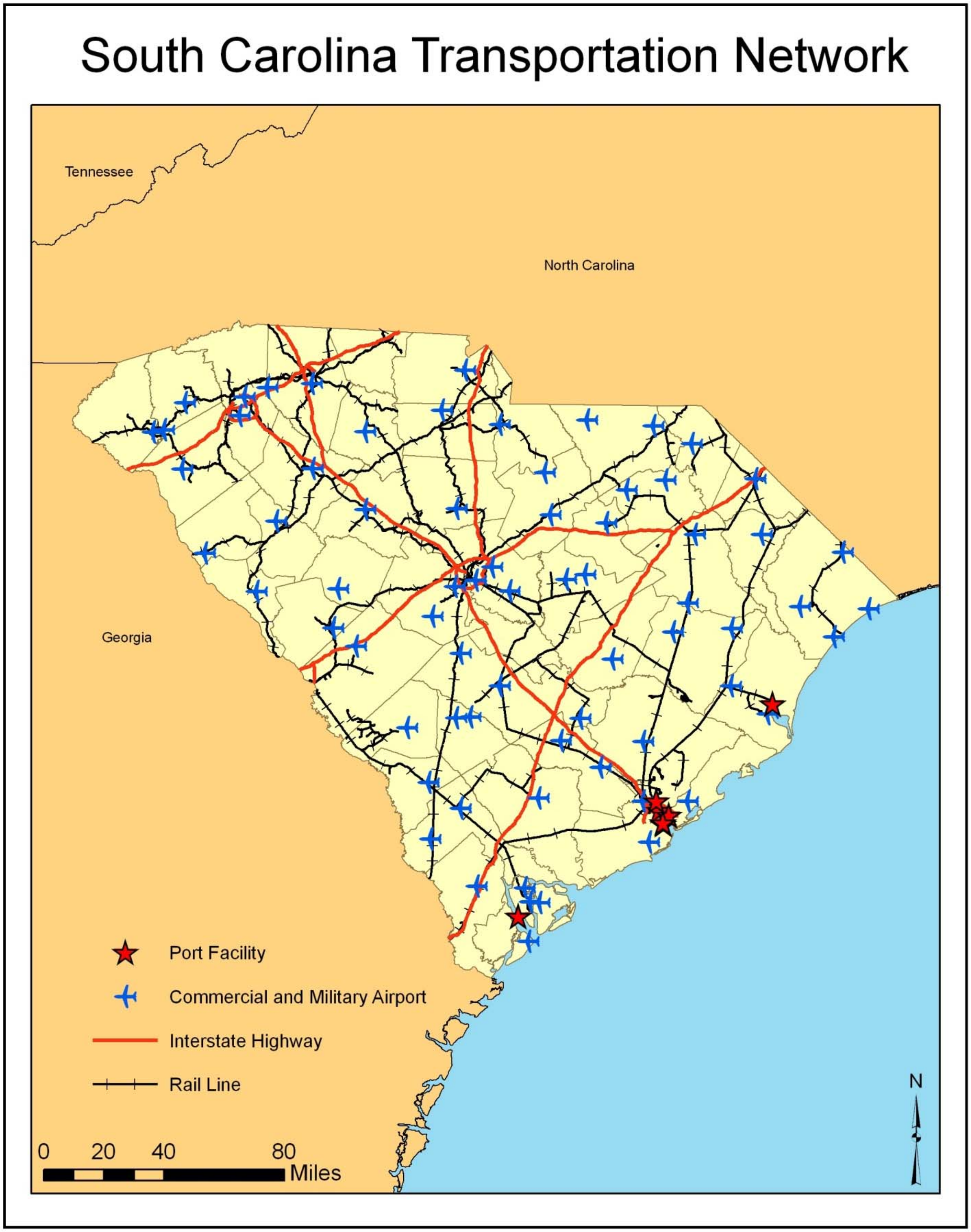

Figure 5.15: South Carolina Commercial and Military Airports, Marine Ports, Railroads, and Interstates

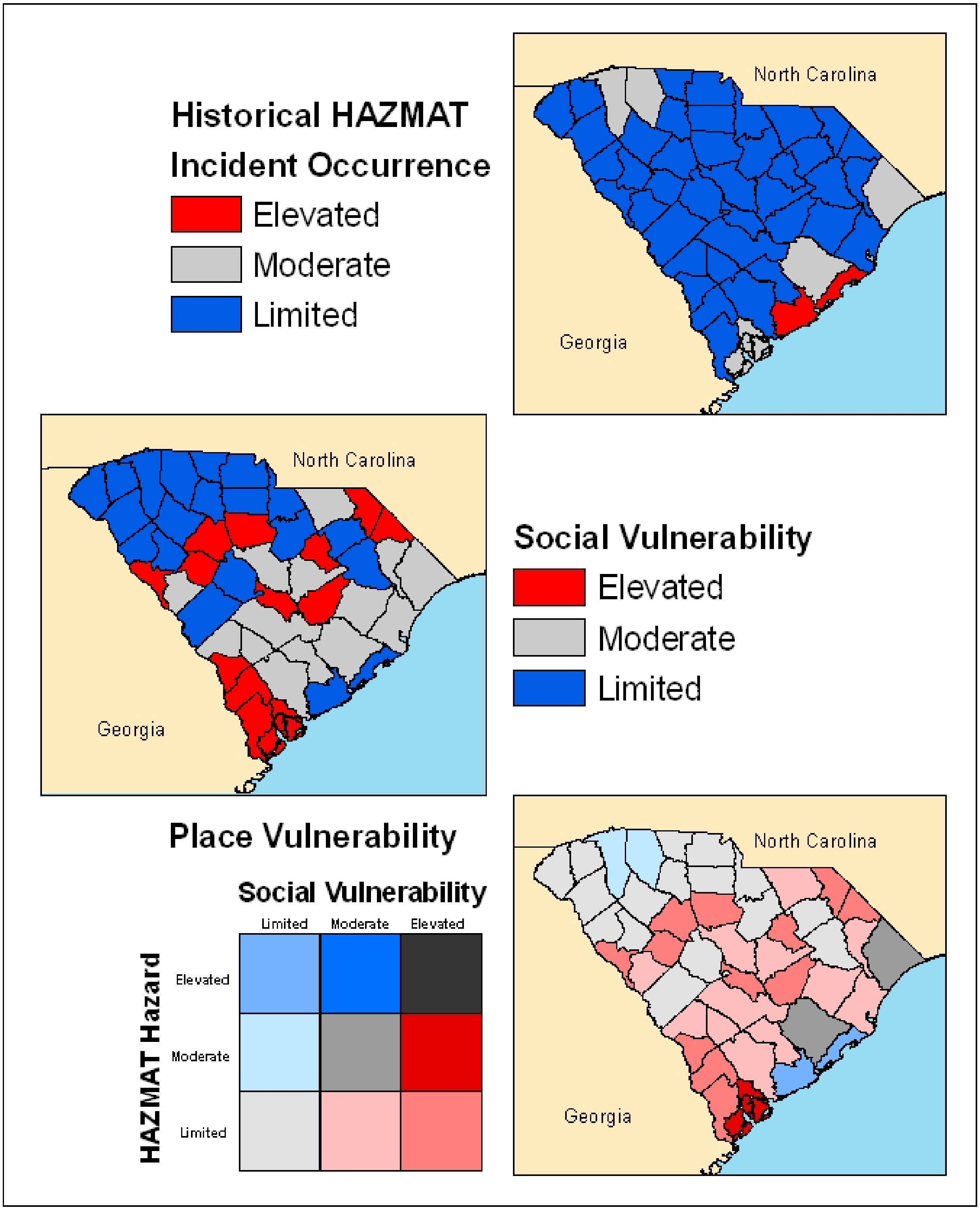

Figure 5.16: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Hazardous Material Incident Hazards

Table 5.10: Counties Ranked by Place Vulnerability for Hazardous Material Incident Hazards

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Charleston	-1.265	0.11	12,204.55	1.00	1.114
2	Saluda	7.315	1.00	395.45	0.02	1.024
3	Dillon	5.769	0.84	245.45	0.01	0.852
4	Marlboro	4.797	0.74	127.27	0.00	0.742
5	Lee	4.678	0.73	259.09	0.01	0.741
6	Jasper	4.565	0.72	250.00	0.01	0.728
7	McCormick	4.585	0.72	200.00	0.01	0.726
8	Beaufort	2.764	0.53	1,977.27	0.16	0.685
9	Allendale	3.954	0.65	159.09	0.00	0.658
10	Berkeley	1.78	0.43	2,000.00	0.16	0.585
11	Clarendon	3.118	0.57	154.55	0.00	0.571
12	Hampton	2.939	0.55	190.91	0.01	0.556
13	Newberry	2.742	0.53	259.09	0.01	0.541
14	Calhoun	2.635	0.52	368.18	0.02	0.539
15	Orangeburg	1.131	0.36	1,700.00	0.13	0.494
16	Fairfield	2.133	0.46	350.00	0.02	0.486
17	Georgetown	1.143	0.36	1,550.00	0.12	0.483
18	Chesterfield	1.955	0.45	213.64	0.01	0.456
19	Horry	0.433	0.29	1,922.73	0.15	0.440
20	Edgefield	1.657	0.42	172.73	0.01	0.422
21	Richland	0.435	0.29	1,490.91	0.11	0.405
22	Bamberg	1.401	0.39	127.27	0.00	0.392
23	Sumter	0.905	0.34	645.45	0.05	0.383
24	Barnwell	1.045	0.35	195.45	0.01	0.360
25	York	-0.505	0.19	1,627.27	0.13	0.319
26	Colleton	0.393	0.29	431.82	0.03	0.313
27	Dorchester	-0.072	0.24	772.73	0.06	0.293
28	Williamsburg	0.122	0.26	145.45	0.00	0.261
29	Greenville	-1.646	0.07	2,222.73	0.18	0.250
30	Marion	0.011	0.25	104.55	0.00	0.246
31	Darlington	-0.573	0.19	450.00	0.03	0.214
32	Florence	-0.927	0.15	831.82	0.06	0.209
33	Spartanburg	-2.179	0.02	2,154.55	0.17	0.189
34	Laurens	-0.961	0.15	381.82	0.02	0.169
35	Aiken	-1.372	0.10	809.09	0.06	0.162
36	Abbeville	-1.054	0.14	100.00	0.00	0.136
37	Chester	-1.357	0.10	463.64	0.03	0.135
38	Lexington	-2.081	0.03	1,245.45	0.09	0.124
39	Greenwood	-1.55	0.08	468.18	0.03	0.115
40	Cherokee	-1.769	0.06	704.55	0.05	0.112
41	Kershaw	-2.036	0.03	700.00	0.05	0.084
42	Lancaster	-1.657	0.07	181.82	0.01	0.080
43	Pickens	-2.082	0.03	600.00	0.04	0.071
44	Oconee	-2.27	0.01	809.09	0.06	0.069
45	Anderson	-2.3	0.01	809.09	0.06	0.066
46	Union	-2.37	0.00	168.18	0.01	0.006

5.7.3 Nuclear Power Plants

South Carolina has 5 nuclear power facilities in the state (Figure 5.17). Three nuclear power facilities are located in neighboring states that could potentially affect South Carolina residents. Five counties serve as host counties for the facilities (Oconee, York, Fairfield, Aiken, and Darlington). All but five of the state's counties fall within the 10-mile or 50-mile emergency- planning zone of at least one nuclear facility. These five are Beaufort, Berkeley, Charleston, Dorchester, and Georgetown.

Nuclear power plant accidents are rare events. According to Duke Power, typical nuclear power plants have the following:

- About one chance in twenty thousand per year that a nuclear power plant will experience a serious accident, and

- About one chance in four million per year that anyone in the public would die as a direct result of a nuclear accident.

Although these statistics suggest that the chances of a serious accident are considered extremely low, annual updates of emergency operation plans for nuclear power plant incidents and regular training exercises are an absolute must to ensure the safety of the public and the environment.

There has been one incident involving radioactive material in the state of South Carolina since 2001, which occurred in Barnwell County (Figure 5.18 top). The May 27th, 2004 incident, classified as a non-emergency event by the Nuclear Regulatory Commission, involved surface contamination levels greater than their prescribed limits. Contamination levels in excess of USDOT (U.S. Department of Transportation) and Barnwell County limits were found on a shipment in a Sea Land container when it reached its destination. A condensation puddle inside the container leaked out onto the trailer bed. There were no personnel exposures.

Given that there has only been one incident, the Place Vulnerability score for nuclear power plant hazards shows Barnwell with the highest score (Table 5.11). The elevated score for nuclear power incidents for Barnwell is offset by its moderate level of social vulnerability (Figure 5.18 bottom).

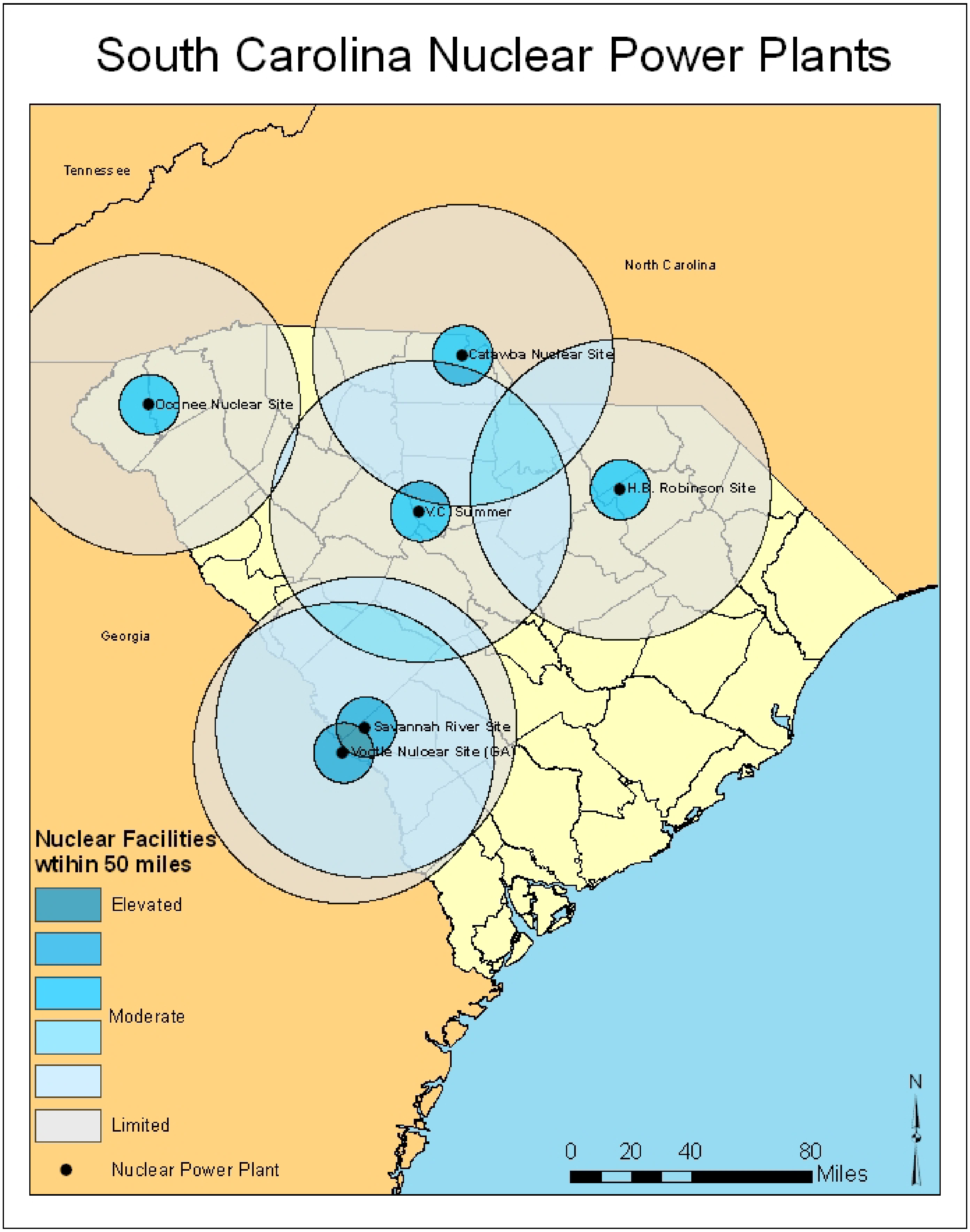

Figure 5.17: Nuclear Facilities Affecting South Carolina

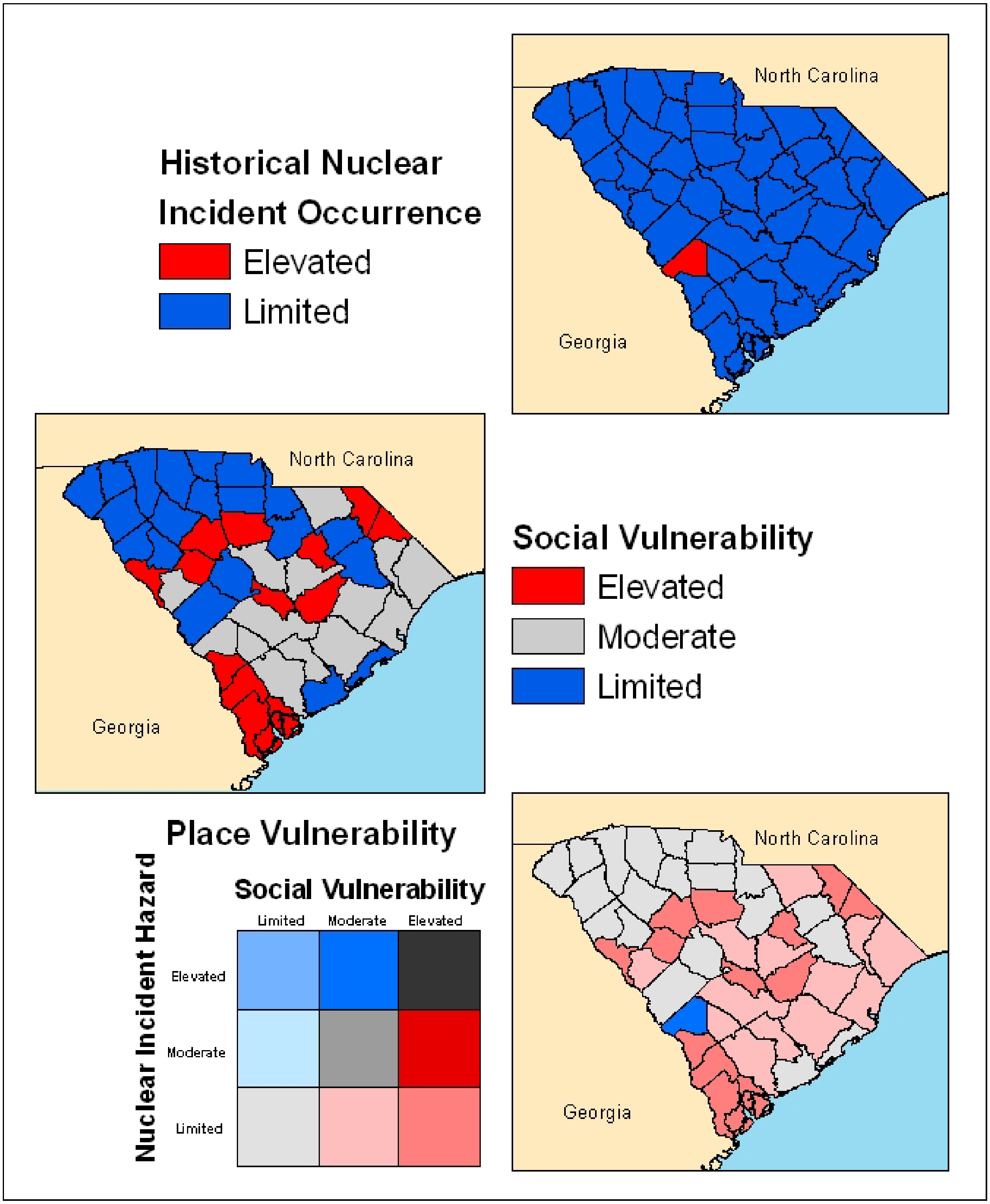

Figure 5.18: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Nuclear Power Hazards

Table 5.11: Counties Ranked by Place Vulnerability for Nuclear Power Hazards

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Barnwell	1.045	0.35	12.50	1.00	1.353
2	Saluda	7.315	1.00	0.00	0.00	1.000
3	Dillon	5.769	0.84	0.00	0.00	0.840
4	Marlboro	4.797	0.74	0.00	0.00	0.740
5	Lee	4.678	0.73	0.00	0.00	0.728
6	McCormick	4.585	0.72	0.00	0.00	0.718
7	Jasper	4.565	0.72	0.00	0.00	0.716
8	Allendale	3.954	0.65	0.00	0.00	0.653
9	Clarendon	3.118	0.57	0.00	0.00	0.567
10	Hampton	2.939	0.55	0.00	0.00	0.548
11	Beaufort	2.764	0.53	0.00	0.00	0.530
12	Newberry	2.742	0.53	0.00	0.00	0.528
13	Calhoun	2.635	0.52	0.00	0.00	0.517
14	Fairfield	2.133	0.46	0.00	0.00	0.465
15	Chesterfield	1.955	0.45	0.00	0.00	0.447
16	Berkeley	1.78	0.43	0.00	0.00	0.428
17	Edgefield	1.657	0.42	0.00	0.00	0.416
18	Bamberg	1.401	0.39	0.00	0.00	0.389
19	Georgetown	1.143	0.36	0.00	0.00	0.363
20	Orangeburg	1.131	0.36	0.00	0.00	0.361
21	Sumter	0.905	0.34	0.00	0.00	0.338
22	Richland	0.435	0.29	0.00	0.00	0.290
23	Horry	0.433	0.29	0.00	0.00	0.289
24	Colleton	0.393	0.29	0.00	0.00	0.285
25	Williamsburg	0.122	0.26	0.00	0.00	0.257
26	Marion	0.011	0.25	0.00	0.00	0.246
27	Dorchester	-0.072	0.24	0.00	0.00	0.237
28	York	-0.505	0.19	0.00	0.00	0.193
29	Darlington	-0.573	0.19	0.00	0.00	0.186
30	Florence	-0.927	0.15	0.00	0.00	0.149
31	Laurens	-0.961	0.15	0.00	0.00	0.145
32	Abbeville	-1.054	0.14	0.00	0.00	0.136
33	Charleston	-1.265	0.11	0.00	0.00	0.114
34	Chester	-1.357	0.10	0.00	0.00	0.105
35	Aiken	-1.372	0.10	0.00	0.00	0.103
36	Greenwood	-1.55	0.08	0.00	0.00	0.085
37	Greenville	-1.646	0.07	0.00	0.00	0.075
38	Lancaster	-1.657	0.07	0.00	0.00	0.074
39	Cherokee	-1.769	0.06	0.00	0.00	0.062
40	Kershaw	-2.036	0.03	0.00	0.00	0.034
41	Lexington	-2.081	0.03	0.00	0.00	0.030
42	Pickens	-2.082	0.03	0.00	0.00	0.030
43	Spartanburg	-2.179	0.02	0.00	0.00	0.020
44	Oconee	-2.27	0.01	0.00	0.00	0.010
45	Anderson	-2.3	0.01	0.00	0.00	0.007
46	Union	-2.37	0.00	0.00	0.00	0.000

5.7.4 Terrorism

Terrorist events for the state were culled from the publically available, Global Terrorism Database (GTD) (http://www.start.umd.edu/gtd/). There are only two recorded incidents for South Carolina from 1970-2007, the period covered by the database. The first was the October 15, 2003 ricin-laced letter addressed to the U.S. Department of Transportation in Washington D.C., which was intercepted at the Greenville, SC mail sorting facility. No one was injured. The second incident occurred on February 20, 2007 in Fountain Inn when the Animal Liberation Front (ALF), an eco-terrorist group, attacked the Blue Chip Rabbit Farm. There were no human injuries reported.

While Greenville County has the highest score on the hazard frequency for terrorism (Table 5.12), the impact is somewhat lessened due to its lower social vulnerability score (Figure 5.19 bottom). The remainder of the state shows limited exposure to terrorist incidents, and limited to elevated levels of social vulnerability. It should be noted, however, that these data and the maps included may underreport the historical frequency of terrorist activity due to the restricted public access to the sensitive data.

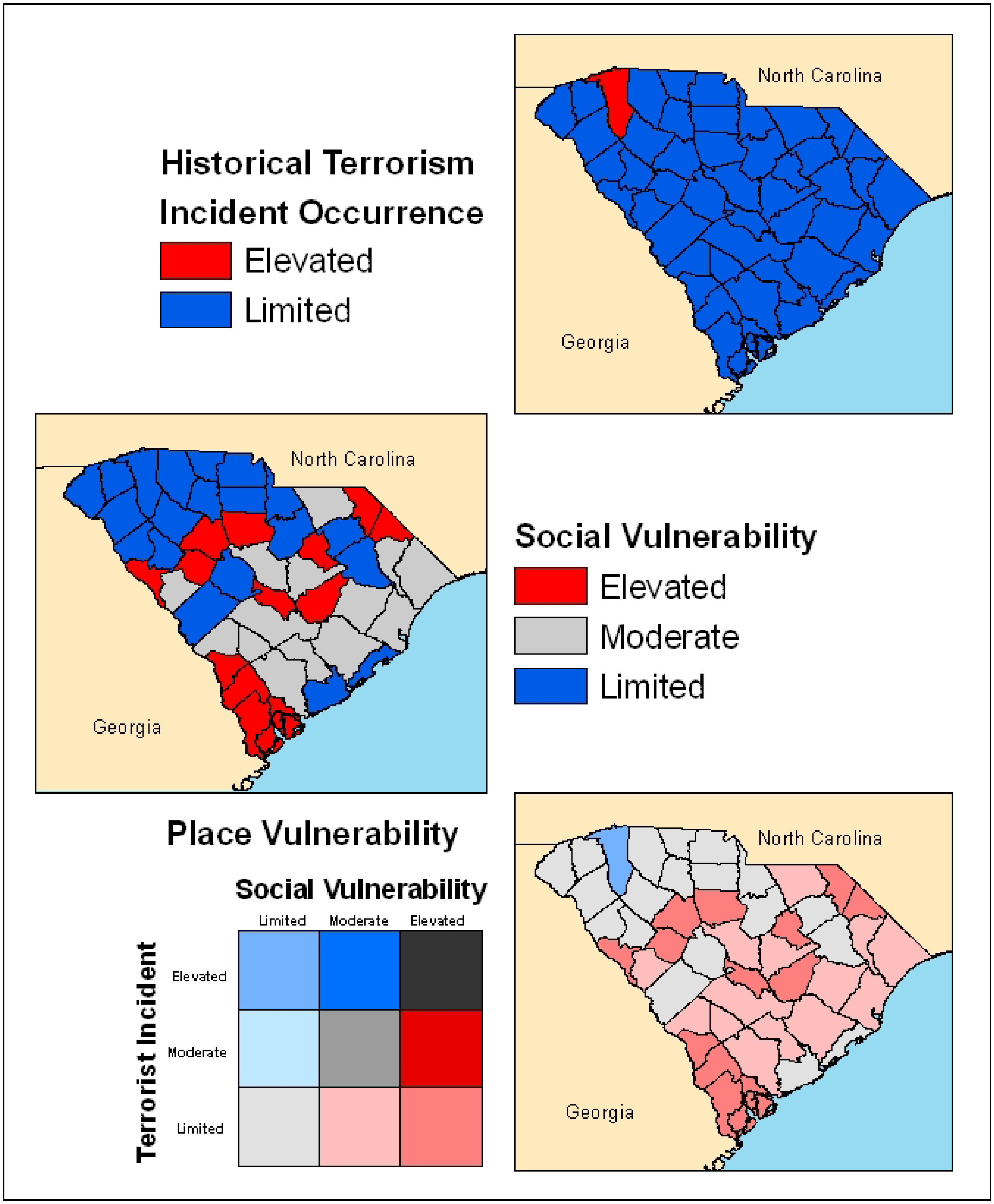

Figure 5.19: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Terrorism Hazards

Table 5.12: Counties Ranked by Place Vulnerability for Terrorism Hazards

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Greenville	-1.646	0.07	3.45	1.00	1.074
2	Saluda	7.315	1.00	0.00	0.00	1.000
3	Dillon	5.769	0.84	0.00	0.00	0.840
4	Marlboro	4.797	0.74	0.00	0.00	0.740
5	Lee	4.678	0.73	0.00	0.00	0.728
6	McCormick	4.585	0.72	0.00	0.00	0.718
7	Jasper	4.565	0.72	0.00	0.00	0.716
8	Allendale	3.954	0.65	0.00	0.00	0.653
9	Clarendon	3.118	0.57	0.00	0.00	0.567
10	Hampton	2.939	0.55	0.00	0.00	0.548
11	Beaufort	2.764	0.53	0.00	0.00	0.530
12	Newberry	2.742	0.53	0.00	0.00	0.528
13	Calhoun	2.635	0.52	0.00	0.00	0.517
14	Fairfield	2.133	0.46	0.00	0.00	0.465
15	Chesterfield	1.955	0.45	0.00	0.00	0.447
16	Berkeley	1.78	0.43	0.00	0.00	0.428
17	Edgefield	1.657	0.42	0.00	0.00	0.416
18	Bamberg	1.401	0.39	0.00	0.00	0.389
19	Georgetown	1.143	0.36	0.00	0.00	0.363
20	Orangeburg	1.131	0.36	0.00	0.00	0.361
21	Barnwell	1.045	0.35	0.00	0.00	0.353
22	Sumter	0.905	0.34	0.00	0.00	0.338
23	Richland	0.435	0.29	0.00	0.00	0.290
24	Horry	0.433	0.29	0.00	0.00	0.289
25	Colleton	0.393	0.29	0.00	0.00	0.285
26	Williamsburg	0.122	0.26	0.00	0.00	0.257
27	Marion	0.011	0.25	0.00	0.00	0.246
28	Dorchester	-0.072	0.24	0.00	0.00	0.237
29	York	-0.505	0.19	0.00	0.00	0.193
30	Darlington	-0.573	0.19	0.00	0.00	0.186
31	Florence	-0.927	0.15	0.00	0.00	0.149
32	Laurens	-0.961	0.15	0.00	0.00	0.145
33	Abbeville	-1.054	0.14	0.00	0.00	0.136
34	Charleston	-1.265	0.11	0.00	0.00	0.114
35	Chester	-1.357	0.10	0.00	0.00	0.105
36	Aiken	-1.372	0.10	0.00	0.00	0.103
37	Greenwood	-1.55	0.08	0.00	0.00	0.085
38	Lancaster	-1.657	0.07	0.00	0.00	0.074
39	Cherokee	-1.769	0.06	0.00	0.00	0.062
40	Kershaw	-2.036	0.03	0.00	0.00	0.034
41	Lexington	-2.081	0.03	0.00	0.00	0.030
42	Pickens	-2.082	0.03	0.00	0.00	0.030
43	Spartanburg	-2.179	0.02	0.00	0.00	0.020
44	Oconee	-2.27	0.01	0.00	0.00	0.010
45	Anderson	-2.3	0.01	0.00	0.00	0.007
46	Union	-2.37	0.00	0.00	0.00	0.000

5.7.5 Transportation (Motor Vehicle)

Data analyzed for this hazard represents the number of transportation accidents from 1999 – 2007. Additionally, the locations of interstates, railways, airports (commercial and military), and marine ports throughout the state are shown in Figure 5.16. Data analyzed represent the number of motor vehicle transportation accidents reported to the South Carolina Department of Public Safety's Office of Highway Safety. The Statistics Section within this office maintains the South Carolina traffic collision database and is the core of data analysis within the Office of Highway Safety. Two publications are made available each year and are disseminated throughout the state, the *South Carolina Traffic Collision Fact Book* and the *South Carolina Commercial Motor Vehicle Traffic Collision Fact Book*. This accident information includes data from numerous transportation sources by county between 1999 and 2007.

As expected, the most populated counties within the state have the highest historical occurrences of a transportation accident. Additionally, the presence of interstate junctions such as I-26/I-85 in the Upstate and I-20/I-26 in Columbia Metropolitan Area are correlated with higher numbers of transportation accidents. The counties with the highest level of transportation accident occurrences are Greenville in the Upstate, Richland in the Midlands, and Charleston in the Low Country (Table 5.13). Counties in the elevated category of transportation accidents are Charleston, Horry, Florence, Lexington, Richland, and those along the I-85 corridor in the Upstate—Anderson, Greenville, Spartanburg, and York (Figure 5.20 top).

The highest Social Vulnerability scores were in Saluda, Dillon, Marlboro, Lee, and McCormick Counties. The middle choropleth map in Figure 5.20 represents the Social Vulnerability scores for the state (see section 3.1).

Richland County has the highest place vulnerability score, which combines elevated hazard occurrence and a moderate level of social vulnerability. Also in this category is Horry County. Charleston and Greenville, along with Florence, Anderson, Spartanburg, and York), have elevated hazard scores, but with a limited social vulnerability, the impact of such hazards is reduced (Figure 5.20 bottom), when compared to Horry and Richland Counties.

Since 2005, six counties have recorded more than 20,000 transportation incidents (motor vehicle). Those counties include: Charleston (39,485), Greenville (36,106), Richland (33,173), Horry (25,209), Spartanburg (20,080) and Lexington (20,062). The most significant non-motor vehicle transportation incident occurred on September 19, 2008, when a Learjet crashed before midnight while taking off from Columbia Metropolitan Airport. Four of the six aboard were killed, while the two survivors suffered from second and third degree burns. The airport was closed until September 21, 2009 because both runways were closed, one for the accident and the other for an ongoing construction project. A tire blow-out on takeoff was determined as the cause of the accident.

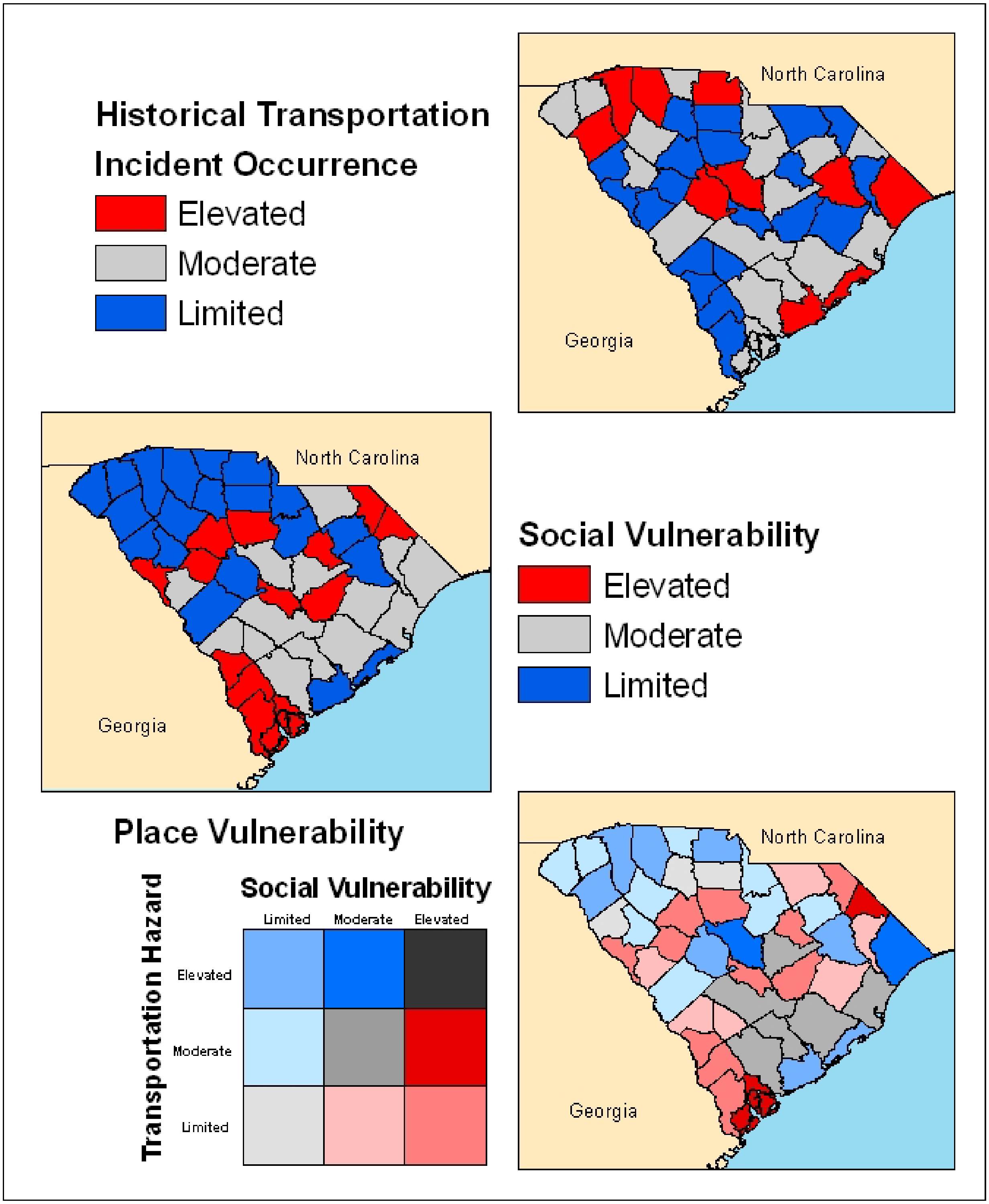

Figure 5.20: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Transportation Hazards

Table 5.13: Counties Ranked by Place Vulnerability for Transportation? Hazards

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Richland	0.435	0.29	941,200.00	0.86	1.151
2	Charleston	-1.265	0.11	1,088,810.00	1.00	1.114
3	Saluda	7.315	1.00	29,560.00	0.01	1.008
4	Greenville	-1.646	0.07	1,013,830.00	0.93	1.005
5	Horry	0.433	0.29	708,430.00	0.64	0.933
6	Dillon	5.769	0.84	83,040.00	0.06	0.898
7	Marlboro	4.797	0.74	55,960.00	0.03	0.772
8	Jasper	4.565	0.72	79,990.00	0.05	0.771
9	Beaufort	2.764	0.53	275,990.00	0.24	0.769
10	Lee	4.678	0.73	32,730.00	0.01	0.738
11	McCormick	4.585	0.72	24,730.00	0.00	0.721
12	Berkeley	1.78	0.43	270,510.00	0.23	0.662
13	Allendale	3.954	0.65	25,190.00	0.00	0.656
14	Clarendon	3.118	0.57	61,530.00	0.04	0.604
15	Newberry	2.742	0.53	78,300.00	0.05	0.581
16	Hampton	2.939	0.55	31,500.00	0.01	0.558
17	Spartanburg	-2.179	0.02	594,730.00	0.54	0.557
18	Orangeburg	1.131	0.36	217,930.00	0.18	0.546
19	York	-0.505	0.19	383,980.00	0.34	0.532
20	Calhoun	2.635	0.52	34,020.00	0.01	0.529
21	Sumter	0.905	0.34	209,200.00	0.18	0.514
22	Lexington	-2.081	0.03	537,580.00	0.48	0.513
23	Chesterfield	1.955	0.45	65,280.00	0.04	0.488
24	Fairfield	2.133	0.46	45,560.00	0.02	0.488
25	Florence	-0.927	0.15	358,850.00	0.32	0.465
26	Georgetown	1.143	0.36	111,110.00	0.08	0.447
27	Edgefield	1.657	0.42	35,300.00	0.01	0.429
28	Dorchester	-0.072	0.24	212,300.00	0.18	0.416
29	Bamberg	1.401	0.39	21,440.00	0.00	0.389
30	Barnwell	1.045	0.35	30,690.00	0.01	0.361
31	Aiken	-1.372	0.10	292,490.00	0.25	0.357
32	Colleton	0.393	0.29	93,310.00	0.07	0.353
33	Anderson	-2.3	0.01	363,170.00	0.32	0.327
34	Williamsburg	0.122	0.26	61,360.00	0.04	0.295
35	Darlington	-0.573	0.19	132,050.00	0.10	0.289
36	Marion	0.011	0.25	50,280.00	0.03	0.273
37	Laurens	-0.961	0.15	141,160.00	0.11	0.258
38	Greenwood	-1.55	0.08	142,890.00	0.11	0.198
39	Pickens	-2.082	0.03	187,470.00	0.16	0.185
40	Lancaster	-1.657	0.07	122,350.00	0.09	0.168
41	Cherokee	-1.769	0.06	130,380.00	0.10	0.164
42	Chester	-1.357	0.10	64,260.00	0.04	0.145
43	Abbeville	-1.054	0.14	29,790.00	0.01	0.144
44	Kershaw	-2.036	0.03	105,710.00	0.08	0.113
45	Oconee	-2.27	0.01	118,880.00	0.09	0.102
46	Union	-2.37	0.00	48,200.00	0.03	0.025

5.8 Severe Thunderstorm Events

Severe thunderstorms produce a multitude of hazards ranging from strong winds and rain, to lightning, hail, and tornados. While often difficult to isolate by specific hazard since they often happen within the same weather system, NCDC's Storm Events database does track each hazard separately.

5.8.1 Funnel Cloud

Funnel cloud hazard data by county from 1993 – 2008 were analyzed to identify spatial trends in impacts from these events. As expected, and similar to tornadoes, historically high occurrences along the coast are associated with land-falling tropical systems. Throughout the rest of the state, many of the historically high occurrence counties are among the counties with the largest populations, which assist in the identification of the funnel clouds. Charleston (6) had the most reported funnel clouds, followed by Spartanburg (5), Anderson (4), and Berkeley (4) (Table 5.14). When the historical frequency is mapped, the all the coastal counties are in the elevated category (Figure 5. 21 top). Richland and Lexington in the Midlands, and Lancaster, Laurens, Anderson, Greenville, Spartanburg, and Cherokee Counties in the Upstate are also in the elevated category of funnel cloud occurrence and should be prepared to respond to emergencies of this nature should they occur.

The highest Social Vulnerability scores were in Saluda, Dillon, Marlboro, Lee, and McCormick Counties. The middle choropleth map in Figure 5.21 represents the Social Vulnerability scores for the state (see section 3.1).

Counties with the highest Place Vulnerability scores for funnel cloud hazards are Saluda, Charleston, Berkeley, Jasper, and Beaufort Counties. This ranking is a function of both the hazard occurrence and the social vulnerability. For example, Saluda is ranked the highest largely due to the moderate level of hazard, but an elevated social vulnerability (shaded in red on Figure 5.21 bottom). On the other hand, Charleston and Spartanburg which had the two highest hazard scores have their overall place vulnerability muted due to the limited social vulnerability. Jasper and Beaufort counties score in the top category for both hazard occurrence and social vulnerability which contributes to their top five ranking for funnel cloud hazards. Priority for planning and hazard mitigation should be directed towards these two counties.

There have been fifteen funnel cloud events in South Carolina since 2006. These events resulted in no fatalities, injuries, or property damage (NCDC Storm Data Online, 2009).

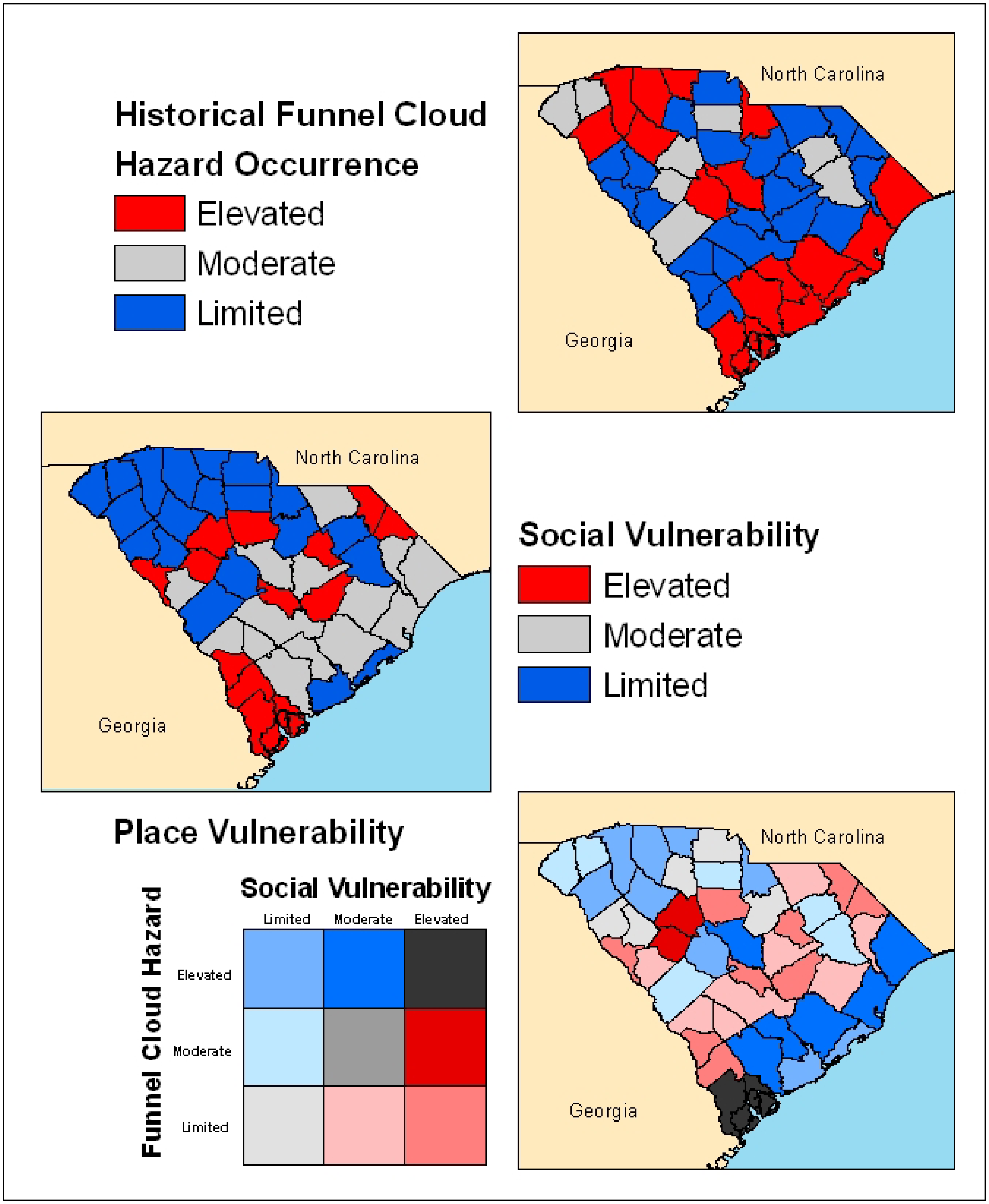

Figure 5.21: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Funnel Cloud Hazard

Table 5.14: Counties Ranked by Place Vulnerability for Funnel Cloud Hazard

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Saluda	7.315	1.00	6.25	0.17	1.167
2	Charleston	-1.265	0.11	37.50	1.00	1.114
3	Berkeley	1.78	0.43	25.00	0.67	1.095
4	Jasper	4.565	0.72	12.50	0.33	1.049
5	Beaufort	2.764	0.53	18.75	0.50	1.030
6	Spartanburg	-2.179	0.02	31.25	0.83	0.853
7	Dillon	5.769	0.84	0.00	0.00	0.840
8	Horry	0.433	0.29	18.75	0.50	0.789
9	Marlboro	4.797	0.74	0.00	0.00	0.740
10	Lee	4.678	0.73	0.00	0.00	0.728
11	McCormick	4.585	0.72	0.00	0.00	0.718
12	Georgetown	1.143	0.36	12.50	0.33	0.696
13	Newberry	2.742	0.53	6.25	0.17	0.694
14	Anderson	-2.3	0.01	25.00	0.67	0.674
15	Allendale	3.954	0.65	0.00	0.00	0.653
16	Laurens	-0.961	0.15	18.75	0.50	0.645
17	Richland	0.435	0.29	12.50	0.33	0.623
18	Colleton	0.393	0.29	12.50	0.33	0.619
19	Greenville	-1.646	0.07	18.75	0.50	0.575
20	Dorchester	-0.072	0.24	12.50	0.33	0.571
21	Clarendon	3.118	0.57	0.00	0.00	0.567
22	Hampton	2.939	0.55	0.00	0.00	0.548
23	Calhoun	2.635	0.52	0.00	0.00	0.517
24	Fairfield	2.133	0.46	0.00	0.00	0.465
25	Chesterfield	1.955	0.45	0.00	0.00	0.447
26	Edgefield	1.657	0.42	0.00	0.00	0.416
27	Lancaster	-1.657	0.07	12.50	0.33	0.407
28	Cherokee	-1.769	0.06	12.50	0.33	0.395
29	Bamberg	1.401	0.39	0.00	0.00	0.389
30	Lexington	-2.081	0.03	12.50	0.33	0.363
31	Orangeburg	1.131	0.36	0.00	0.00	0.361
32	Barnwell	1.045	0.35	0.00	0.00	0.353
33	Darlington	-0.573	0.19	6.25	0.17	0.352
34	Sumter	0.905	0.34	0.00	0.00	0.338
35	Florence	-0.927	0.15	6.25	0.17	0.316
36	Chester	-1.357	0.10	6.25	0.17	0.271
37	Aiken	-1.372	0.10	6.25	0.17	0.270
38	Williamsburg	0.122	0.26	0.00	0.00	0.257
39	Marion	0.011	0.25	0.00	0.00	0.246
40	Pickens	-2.082	0.03	6.25	0.17	0.196
41	York	-0.505	0.19	0.00	0.00	0.193
42	Oconee	-2.27	0.01	6.25	0.17	0.177
43	Abbeville	-1.054	0.14	0.00	0.00	0.136
44	Greenwood	-1.55	0.08	0.00	0.00	0.085
45	Kershaw	-2.036	0.03	0.00	0.00	0.034
46	Union	-2.37	0.00	0.00	0.00	0.000

5.8.2 Hail

Data were analyzed for hail hazards per county from 1950 – 2008. Hail is only reported if it is 0.75 inches in diameter or greater. Areas in the upstate have a greater chance of receiving hail, because the atmosphere near the coast tends to be warmer. Also, the distance between the cloud base and ground is a factor in hail size allowing for larger hail in the Upstate even though coastal areas may receive more thunderstorm events. Greenville had the most hail reports (210), followed by Spartanburg (199), Berkeley (189), Charleston (175), and Lexington (168) (Table 5.15). Elevated levels of hail hazards are found along the coast (Charleston, Berkeley, Horry Counties), in the central portion of the state (Orangeburg, Aiken, Lexington, and Richland Counties) and in the Upstate (Oconee, Anderson, Greenville, and Spartanburg Counties) (Figure 5.22 top).

The highest Social Vulnerability scores were in Saluda, Dillon, Marlboro, Lee, and McCormick Counties. The middle choropleth map in Figure 5.20 represents the Social Vulnerability scores for the state (see section 3.1).

Counties with the highest Place Vulnerability scores for hail are Berkeley, Saluda, Greenville, Dillon, and Spartanburg Counties. For Berkeley, Greenville, and Spartanburg, the Place Vulnerability score is driven by the hazard occurrence, while for Dillon and Saluda, the place vulnerability is related to limited hazard occurrences, but elevated levels of social vulnerability. Counties with elevated hail occurrences and moderate social vulnerability are Berkeley, Horry, Orangeburg, and Richland (Figure 5.22 bottom).

There have been 1,262 hail events in South Carolina since 2006, recording one death, ten injuries, and $3.9 million in property damage (NCDC Storm Data Online, 2009). Four of these events are considered significant (causing more than $1 million in property damage or causing a death or injury) in our state. The first event was June 4, 2006 in Sumter County, near the city of Sumter. Nine people were injured at the Walters Care Facility when 0.75 inch hail was reported.

On March 15, 2008, a severe weather outbreak took place throughout South Carolina. In Greenwood County, hail caused $2.8 million dollars in property damage near the cities of Bradley and Kirksey. The combination of strong wind and golf ball sized hail damaged 507 structures in the southern part of Greenwood County. Most of the damage came from broken windows, damaged roofs, or damaged siding. Also on March 15, Hilton Head Island Airport in Beaufort County reported 2.75 inch hail (baseball sized). The Beaufort County Emergency Manager and the fixed airport base operator reported that 62 planes sustained damage. Approximately, ten percent of the planes were reported as a total loss, and twenty-five percent were not longer air worthy. In addition to the aircraft damage, many cars sustained damage.

The fourth event occurred on May 20, 2008 in Bamberg County near Olar, causing one death and one injury. Law enforcement reported tennis ball sized hail (2.00 inches). Storm surveys found many homes had damage to siding, windows, and roofs. One woman was injured by flying glass in her automobile. Crops were also flattened and there was a blanked of leaves and pine needles covered the ground and roads. One lady was killed while in her car.

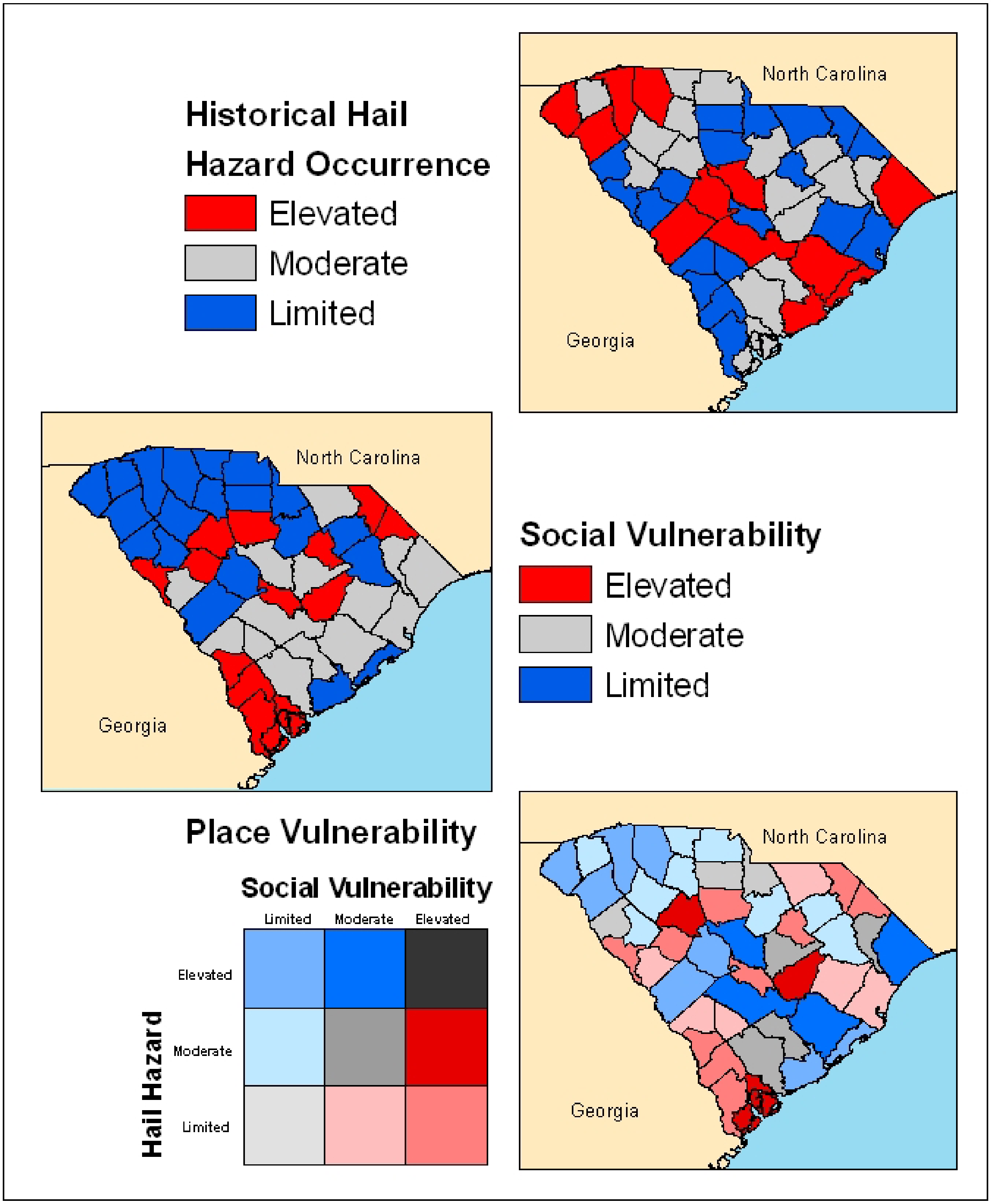

Figure 5.22: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Hail Hazard

Table 5.15: Counties Ranked by Place Vulnerability for Hail Hazard

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Berkeley	1.78	0.43	320.34	0.89	1.315
2	Saluda	7.315	1.00	79.66	0.12	1.119
3	Greenville	-1.646	0.07	355.93	1.00	1.075
4	Dillon	5.769	0.84	89.83	0.15	0.992
5	Spartanburg	-2.179	0.02	337.29	0.94	0.960
6	Orangeburg	1.131	0.36	227.12	0.59	0.951
7	Richland	0.435	0.29	249.15	0.66	0.949
8	Charleston	-1.265	0.11	296.61	0.81	0.925
9	Clarendon	3.118	0.57	152.54	0.35	0.918
10	Horry	0.433	0.29	225.42	0.58	0.873
11	Marlboro	4.797	0.74	77.97	0.11	0.854
12	Lee	4.678	0.73	67.80	0.08	0.809
13	Lexington	-2.081	0.03	284.75	0.77	0.803
14	Beaufort	2.764	0.53	113.56	0.23	0.757
15	McCormick	4.585	0.72	49.15	0.02	0.740
16	Newberry	2.742	0.53	108.47	0.21	0.739
17	Jasper	4.565	0.72	44.07	0.01	0.721
18	Calhoun	2.635	0.52	93.22	0.16	0.679
19	Allendale	3.954	0.65	42.37	0.00	0.653
20	Anderson	-2.3	0.01	244.07	0.64	0.650
21	Aiken	-1.372	0.10	208.47	0.53	0.633
22	Dorchester	-0.072	0.24	166.10	0.39	0.632
23	Colleton	0.393	0.29	150.85	0.35	0.631
24	Chesterfield	1.955	0.45	91.53	0.16	0.603
25	Sumter	0.905	0.34	122.03	0.25	0.592
26	Hampton	2.939	0.55	55.93	0.04	0.591
27	Fairfield	2.133	0.46	77.97	0.11	0.578
28	York	-0.505	0.19	161.02	0.38	0.571
29	Florence	-0.927	0.15	172.88	0.42	0.565
30	Edgefield	1.657	0.42	81.36	0.12	0.540
31	Georgetown	1.143	0.36	83.05	0.13	0.492
32	Laurens	-0.961	0.15	150.85	0.35	0.491
33	Bamberg	1.401	0.39	72.88	0.10	0.487
34	Oconee	-2.27	0.01	188.14	0.46	0.475
35	Darlington	-0.573	0.19	132.20	0.29	0.472
36	Barnwell	1.045	0.35	74.58	0.10	0.455
37	Marion	0.011	0.25	103.39	0.19	0.440
38	Williamsburg	0.122	0.26	94.92	0.17	0.425
39	Pickens	-2.082	0.03	152.54	0.35	0.381
40	Greenwood	-1.55	0.08	133.90	0.29	0.377
41	Cherokee	-1.769	0.06	135.59	0.30	0.359
42	Kershaw	-2.036	0.03	127.12	0.27	0.305
43	Abbeville	-1.054	0.14	94.92	0.17	0.303
44	Chester	-1.357	0.10	101.69	0.19	0.294
45	Lancaster	-1.657	0.07	91.53	0.16	0.230
46	Union	-2.37	0.00	108.47	0.21	0.211

5.8.3 Heavy Precipitation

Heavy precipitation data is represented as rain events that have an excessive amount of precipitation for the time and location according to NCDC. The data include events between 1993 and 2008. Historically, coastal counties have experienced the majority of these hazard events. Laurens, Georgetown, Greenville, Spartanburg, and Horry Counties have the greatest number of historical hazard occurrences (Table 5.16). Elevated levels of heavy precipitation hazards are found along the coast (Georgetown and Horry counties), inland in Darlington County, and in the Upstate (Figure 5.23 top).

The highest Social Vulnerability scores were in Saluda, Dillon, Marlboro, Lee, and McCormick Counties. The middle choropleth map in Figure 5.23 represents the Social Vulnerability scores for the state (see section 3.1).

Laurens County has the greatest Place Vulnerability to heavy precipitation hazard, while Saluda, Georgetown, McCormick, and Dillon round out the top five counties. The elevated rainfall hazard in the Upstate (including Laurens) and in Darlington County is moderated by the lower social vulnerability (Figure 5.23 bottom). Elevated levels of exposure plus moderate levels of social vulnerability are found in Georgetown and Horry counties, and these places should have a priority for planning and mitigation for this hazard.

South Carolina has been affect by twenty-five precipitation events since 2006. These events are responsible for one fatality, no injuries, and $205,000 in damage. The fatality occurred on September 6, 2008 near Andrews in Georgetown County, when a motorist lost control of the vehicle, crashed into a drainage ditch, and then drowned.

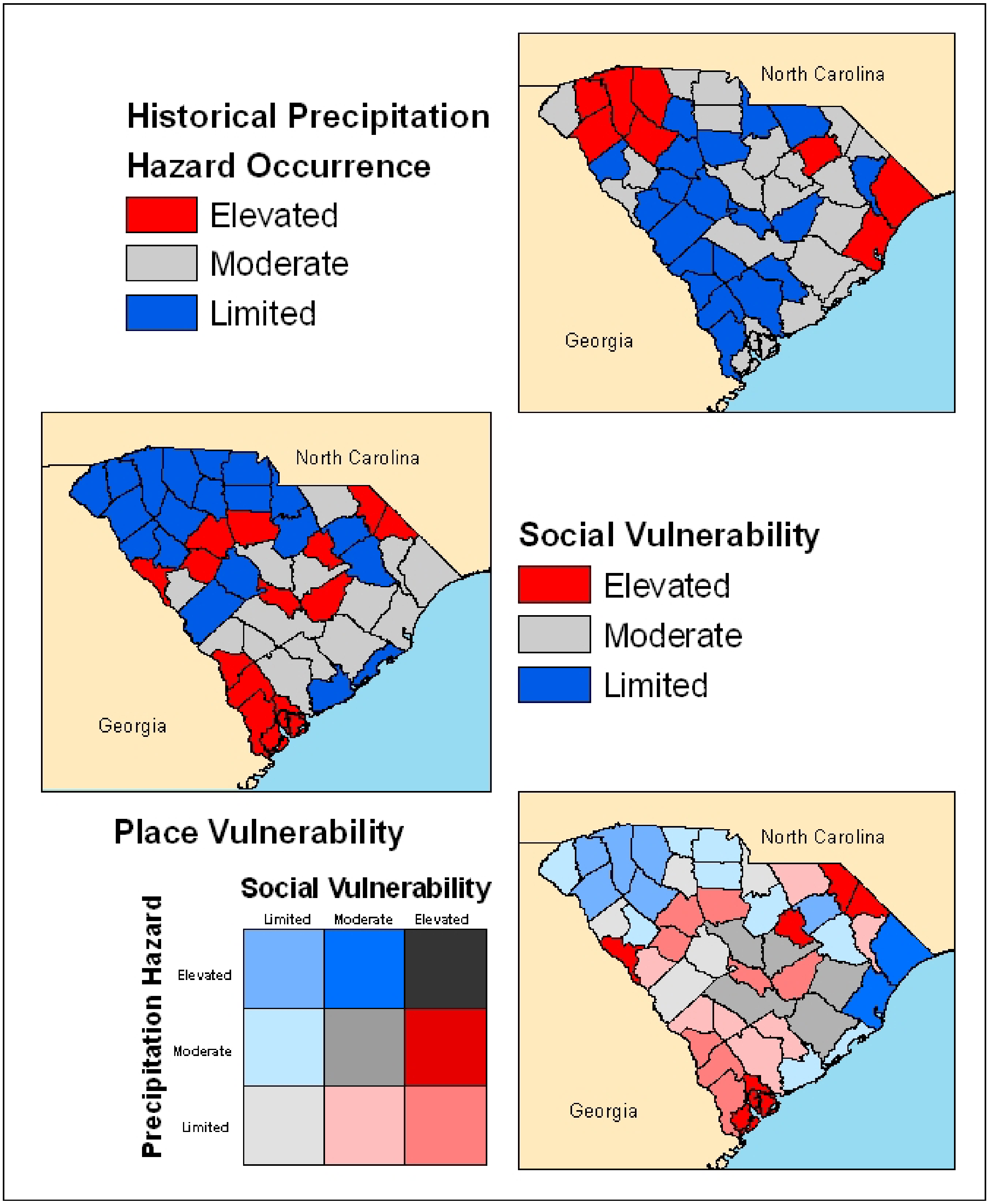

Figure 5.21: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Heavy Precipitation Hazard

Table 5.16: Counties Ranked by Place Vulnerability for Heavy Precipitation Hazard

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Laurens	-0.961	0.15	213.33	1.00	1.145
2	Saluda	7.315	1.00	0.00	0.00	1.000
3	Georgetown	1.143	0.36	126.67	0.59	0.956
4	McCormick	4.585	0.72	40.00	0.19	0.906
5	Dillon	5.769	0.84	6.67	0.03	0.872
6	Marlboro	4.797	0.74	6.67	0.03	0.771
7	Lee	4.678	0.73	6.67	0.03	0.759
8	Jasper	4.565	0.72	0.00	0.00	0.716
9	Allendale	3.954	0.65	0.00	0.00	0.653
10	Beaufort	2.764	0.53	13.33	0.06	0.593
11	Horry	0.433	0.29	60.00	0.28	0.571
12	Clarendon	3.118	0.57	0.00	0.00	0.567
13	Hampton	2.939	0.55	0.00	0.00	0.548
14	Newberry	2.742	0.53	0.00	0.00	0.528
15	Calhoun	2.635	0.52	0.00	0.00	0.517
16	Fairfield	2.133	0.46	0.00	0.00	0.465
17	Berkeley	1.78	0.43	6.67	0.03	0.460
18	Greenville	-1.646	0.07	80.00	0.38	0.450
19	Chesterfield	1.955	0.45	0.00	0.00	0.447
20	Edgefield	1.657	0.42	0.00	0.00	0.416
21	Darlington	-0.573	0.19	46.67	0.22	0.404
22	Orangeburg	1.131	0.36	6.67	0.03	0.393
23	Bamberg	1.401	0.39	0.00	0.00	0.389
24	Sumter	0.905	0.34	6.67	0.03	0.369
25	Spartanburg	-2.179	0.02	73.33	0.34	0.363
26	Barnwell	1.045	0.35	0.00	0.00	0.353
27	Williamsburg	0.122	0.26	20.00	0.09	0.351
28	York	-0.505	0.19	33.33	0.16	0.349
29	Florence	-0.927	0.15	40.00	0.19	0.336
30	Richland	0.435	0.29	6.67	0.03	0.321
31	Colleton	0.393	0.29	0.00	0.00	0.285
32	Pickens	-2.082	0.03	53.33	0.25	0.280
33	Anderson	-2.3	0.01	53.33	0.25	0.257
34	Marion	0.011	0.25	0.00	0.00	0.246
35	Dorchester	-0.072	0.24	0.00	0.00	0.237
36	Oconee	-2.27	0.01	40.00	0.19	0.198
37	Cherokee	-1.769	0.06	26.67	0.13	0.187
38	Greenwood	-1.55	0.08	13.33	0.06	0.147
39	Charleston	-1.265	0.11	6.67	0.03	0.145
40	Abbeville	-1.054	0.14	0.00	0.00	0.136
41	Chester	-1.357	0.10	6.67	0.03	0.136
42	Aiken	-1.372	0.10	0.00	0.00	0.103
43	Lancaster	-1.657	0.07	0.00	0.00	0.074
44	Kershaw	-2.036	0.03	6.67	0.03	0.066
45	Lexington	-2.081	0.03	0.00	0.00	0.030
46	Union	-2.37	0.00	0.00	0.00	0.000

5.8.4 Lightning

Lightning hazard frequency data represent the number of documented incidents per county from 1950 – 2008. Beaufort County has the highest occurrence, closely followed by Spartanburg (Table 5.17), Horry, and York Counties. Elevated levels of lightning hazards are found in two locations—in the coastal counties and in the Upstate along the I-85 corridor (Figure 5.24 top).

The highest Social Vulnerability scores were in Saluda, Dillon, Marlboro, Lee, and McCormick Counties. The middle choropleth map in Figure 5.24 represents the Social Vulnerability scores for the state (see section 3.1).

The counties displaying the greatest place vulnerability to the lightning hazards are scattered throughout the state and include Beaufort, Horry, Saluda, Spartanburg, and Dillon. For Saluda and Dillon, the place vulnerability to lightning is driven by elevated levels of social vulnerability, and limited lightning occurrences. For the Upstate Counties, the impact of the lightning hazard on place vulnerability is muted by the limited social vulnerability. Finally, Beaufort County has a combination of elevated lightning occurrences coupled with elevated social vulnerability which makes this county most susceptible to the impacts of this hazard (Figure 5.24 bottom). Priority for planning and mitigation of this hazard should be directed toward Beaufort County.

Since 2006, there have been forty-seven lightning events reported in South Carolina, causing six fatalities, fifteen injuries, and over $4.4 million dollars in property damage. The costliest event occurred on June 12, 2008 in Columbia, Richland County. Lightning struck a tree and ran through the ground into the home, starting a fire. This event caused $1.5 million in damage. Most of the deaths can be attributed to being in an open area.

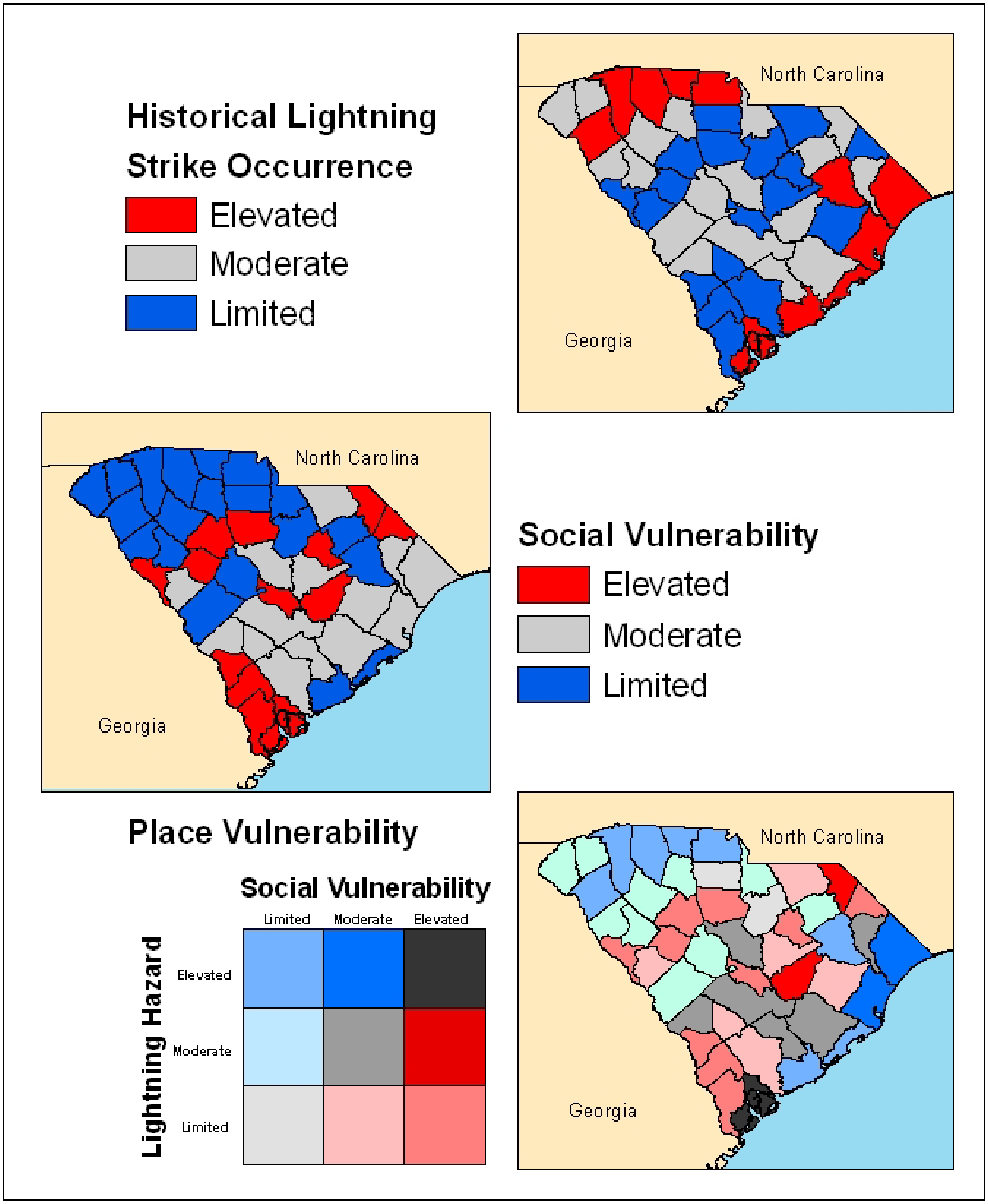

Figure 5.24: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Lightning Hazard

Table 5.17: Counties Ranked by Place Vulnerability for Lightning Hazard

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Beaufort	2.764	0.53	212.50	1.00	1.530
2	Horry	0.433	0.29	162.50	0.76	1.054
3	Saluda	7.315	1.00	0.00	0.00	1.000
4	Spartanburg	-2.179	0.02	200.00	0.94	0.961
5	Dillon	5.769	0.84	12.50	0.06	0.899
6	Marlboro	4.797	0.74	31.25	0.15	0.887
7	Georgetown	1.143	0.36	106.25	0.50	0.863
8	York	-0.505	0.19	131.25	0.62	0.810
9	McCormick	4.585	0.72	12.50	0.06	0.777
10	Lee	4.678	0.73	6.25	0.03	0.757
11	Clarendon	3.118	0.57	37.50	0.18	0.743
12	Jasper	4.565	0.72	0.00	0.00	0.716
13	Berkeley	1.78	0.43	56.25	0.26	0.693
14	Allendale	3.954	0.65	6.25	0.03	0.682
15	Orangeburg	1.131	0.36	56.25	0.26	0.626
16	Florence	-0.927	0.15	100.00	0.47	0.620
17	Charleston	-1.265	0.11	106.25	0.50	0.614
18	Hampton	2.939	0.55	12.50	0.06	0.607
19	Richland	0.435	0.29	62.50	0.29	0.584
20	Greenville	-1.646	0.07	106.25	0.50	0.575
21	Dorchester	-0.072	0.24	68.75	0.32	0.561
22	Newberry	2.742	0.53	6.25	0.03	0.557
23	Calhoun	2.635	0.52	6.25	0.03	0.546
24	Chesterfield	1.955	0.45	18.75	0.09	0.535
25	Barnwell	1.045	0.35	31.25	0.15	0.500
26	Anderson	-2.3	0.01	100.00	0.47	0.478
27	Fairfield	2.133	0.46	0.00	0.00	0.465
28	Bamberg	1.401	0.39	12.50	0.06	0.448
29	Cherokee	-1.769	0.06	81.25	0.38	0.444
30	Aiken	-1.372	0.10	68.75	0.32	0.427
31	Marion	0.011	0.25	37.50	0.18	0.422
32	Edgefield	1.657	0.42	0.00	0.00	0.416
33	Greenwood	-1.55	0.08	62.50	0.29	0.379
34	Abbeville	-1.054	0.14	50.00	0.24	0.371
35	Sumter	0.905	0.34	6.25	0.03	0.368
36	Laurens	-0.961	0.15	43.75	0.21	0.351
37	Williamsburg	0.122	0.26	18.75	0.09	0.346
38	Colleton	0.393	0.29	12.50	0.06	0.344
39	Darlington	-0.573	0.19	31.25	0.15	0.333
40	Lancaster	-1.657	0.07	50.00	0.24	0.309
41	Oconee	-2.27	0.01	50.00	0.24	0.246
42	Lexington	-2.081	0.03	43.75	0.21	0.236
43	Pickens	-2.082	0.03	37.50	0.18	0.206
44	Union	-2.37	0.00	43.75	0.21	0.206
45	Chester	-1.357	0.10	0.00	0.00	0.105
46	Kershaw	-2.036	0.03	12.50	0.06	0.093

5.8.5 Thunderstorm Wind

Thunderstorm wind hazard frequency data represent the number of documented incidents per county from 1950 – 2008. Spartanburg has the highest thunderstorm occurrence followed by Greenville, Lexington, Anderson, and then Richland (Table 5.18). Regionally, elevated thunderstorm occurrences are in the Upstate counties, in the midlands from Aiken to Richland and to Orangeburg Counties, and in the Charleston metropolitan counties. Horry County also has elevated levels of thunderstorm hazards (Figure 5.25 top).

The highest Social Vulnerability scores were in Saluda, Dillon, Marlboro, Lee, and McCormick Counties. The middle choropleth map in Figure 5.25 represents the Social Vulnerability scores for the state (see section 3.1).

The counties displaying the greatest Place Vulnerability to the thunderstorm wind hazards are Saluda, Greenville, Spartanburg, Dillon, and Richland. The high ranking of Saluda and Dillon is a function of limited hazard occurrence, but elevated social vulnerability. Conversely, for Greenville, Spartanburg, and Richland, it is the combination of elevated levels of hazard occurrences coupled with limited to moderate levels of social vulnerability that place these three counties in the top five. When mapping both the social vulnerability and the hazard occurrence, the place vulnerability for thunderstorm hazards is clustered in five counties: Richland, Orangeburg, Berkeley, Colleton, and Horry (Figure 5.25 bottom), which combine elevated hazard scores with moderate levels of social vulnerability. The other elevated hazard occurrence counties have limited social vulnerability, which reduces their overall place vulnerability (areas shaded in light blue on Figure 5.25 bottom).

Since 2006, there have been 1,532 lightning events reported in South Carolina, causing six fatalities, eighteen injuries, and over $15.297 million dollars in property and crop damage. The costliest event occurred on June 14, 2007 three miles to the east of Campobello in Spartanburg County. Thunderstorm winds associated with an isolated microburst with estimated gusts of 60 miles per hour collapsed a large manufacturing building that was under construction causing $8 million dollars of property damage. Some construction equipment was heavily damaged or destroyed by the collapsing building. On August 10, 2008, another thunderstorm wind event with estimated wind gusts of 95 miles per hour impacted Horry County causing $1 million dollars in property damage and injuring nine people. In late August of 2006, the city of Greenville in Greenville County experienced thunderstorm wind gusts over 50 miles per hour. A large oak tree was blown down on to a moving vehicle, resulting in one fatality. Also, in November 2006 a boat overturned on Lake Moultrie, where two people drowned. Another death occurred on April 16, 2007 in Walhalla, SC when a tree fell and crushed the outbuilding that a man was in. The final two deaths occurred on April 15, 2008 in Charleston County (NCDC Storm Data Reports Online, 2009).

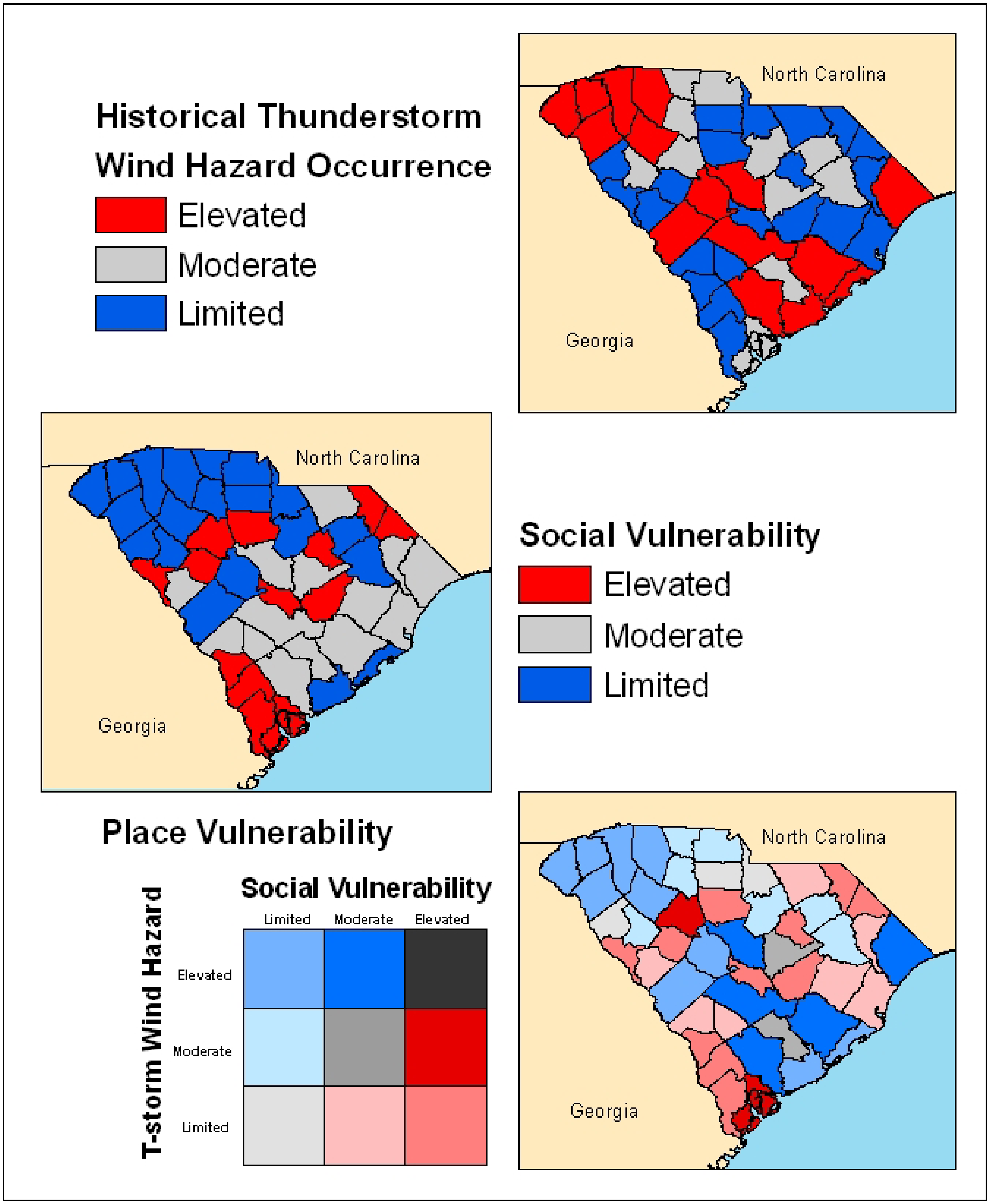

Figure 5.25: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Thunderstorm Wind Hazard

Table 5.18: Counties Ranked by Place Vulnerability for Thunderstorm Wind Hazard

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Saluda	7.315	1.00	152.54	0.13	1.132
2	Greenville	-1.646	0.07	591.53	0.98	1.058
3	Spartanburg	-2.179	0.02	600.00	1.00	1.020
4	Dillon	5.769	0.84	172.88	0.17	1.011
5	Richland	0.435	0.29	455.93	0.72	1.010
6	Orangeburg	1.131	0.36	394.92	0.60	0.963
7	Colleton	0.393	0.29	416.95	0.64	0.930
8	Beaufort	2.764	0.53	283.05	0.38	0.915
9	Berkeley	1.78	0.43	332.20	0.48	0.909
10	Lexington	-2.081	0.03	530.51	0.87	0.895
11	Marlboro	4.797	0.74	161.02	0.15	0.888
12	Jasper	4.565	0.72	161.02	0.15	0.864
13	Lee	4.678	0.73	130.51	0.09	0.817
14	Anderson	-2.3	0.01	498.31	0.80	0.810
15	Charleston	-1.265	0.11	432.20	0.67	0.788
16	Clarendon	3.118	0.57	196.61	0.22	0.784
17	Newberry	2.742	0.53	215.25	0.25	0.781
18	Horry	0.433	0.29	328.81	0.47	0.763
19	Hampton	2.939	0.55	191.53	0.21	0.755
20	Allendale	3.954	0.65	130.51	0.09	0.742
21	McCormick	4.585	0.72	84.75	0.00	0.718
22	Sumter	0.905	0.34	272.88	0.37	0.703
23	Dorchester	-0.072	0.24	311.86	0.44	0.678
24	Laurens	-0.961	0.15	352.54	0.52	0.665
25	Fairfield	2.133	0.46	186.44	0.20	0.662
26	Aiken	-1.372	0.10	371.19	0.56	0.659
27	Calhoun	2.635	0.52	154.24	0.13	0.652
28	York	-0.505	0.19	320.34	0.46	0.650
29	Chesterfield	1.955	0.45	166.10	0.16	0.604
30	Bamberg	1.401	0.39	164.41	0.15	0.544
31	Pickens	-2.082	0.03	337.29	0.49	0.520
32	Edgefield	1.657	0.42	128.81	0.09	0.501
33	Barnwell	1.045	0.35	161.02	0.15	0.501
34	Florence	-0.927	0.15	264.41	0.35	0.498
35	Georgetown	1.143	0.36	149.15	0.12	0.488
36	Oconee	-2.27	0.01	328.81	0.47	0.484
37	Darlington	-0.573	0.19	228.81	0.28	0.465
38	Greenwood	-1.55	0.08	262.71	0.35	0.430
39	Cherokee	-1.769	0.06	264.41	0.35	0.411
40	Marion	0.011	0.25	155.93	0.14	0.384
41	Kershaw	-2.036	0.03	238.98	0.30	0.334
42	Abbeville	-1.054	0.14	183.05	0.19	0.327
43	Williamsburg	0.122	0.26	120.34	0.07	0.326
44	Chester	-1.357	0.10	189.83	0.20	0.309
45	Union	-2.37	0.00	225.42	0.27	0.273
46	Lancaster	-1.657	0.07	166.10	0.16	0.232

5.8.6 Tornado

Tornado hazard frequency data represent the number of documented incidents or reported tornado touchdowns per county from 1950 – 2008. The highest frequency of occurrence is in Orangeburg County, followed by Charleston, Horry, Richland, and Aiken (Table 5.19). When mapped, we find a distinct region of elevated tornado occurrence in a swath stretching from Aiken County to Florence and from Orangeburg County to the coast (Figure 5.26 top). Other counties with elevated tornado occurrences include Horry, Richland, Newberry, Spartanburg, and Anderson.

The middle choropleth map in Figure 5.26 represents the Social Vulnerability scores for the state (see section 3.1).

The counties displaying the greatest Place Vulnerability to the tornado threat are scattered throughout the state and include Orangeburg, Newberry, Saluda, Horry, and Clarendon Counties. When examining the hazard occurrence and social vulnerability, two counties stand out in their place vulnerability: Clarendon and Newberry Counties which have elevated levels of both tornado occurrences and social vulnerability. Priority for planning and mitigation should be directed toward these two counties. For Richland, Orangeburg, Berkeley and Horry Counties, the place vulnerability is a product of the elevated hazard occurrence plus moderate levels of social vulnerability, while in Charleston, Aiken, Anderson, and Spartanburg, the elevated tornado occurrence is muted by the limited social vulnerability (Figure 5.26 bottom).

Since 2006, there have been 122 tornado touch downs within the state ranging from EF0 (weak winds and no notable damage) to EF3 (damage to single-wide mobile homes, small barns and outbuildings, and some one – or two- family residences). Together, these tornadoes are responsible for 65 injuries, 3 deaths, and $6.7 million dollars in property and crop damage. Within the time span, there were three EF3 tornado events, in Sumter, Orangeburg, and Newberry Counties. These events are responsible all three deaths. There have been six EF2 tornadoes (Florence, Kershaw, Aiken, Charleston, Pickens, and Dillon Counties).

On April 15, 2005 an EF3 tornado near Pinewood, SC in Sumter County struck in the early morning, killing one person and injuring five. An EF3 struck on March 15, 2008 near Trinity in Newberry County, injuring two and killing two. The same system produced an EF3 tornado in Orangeburg that day, but no injuries or damages were recorded. The costliest tornadoes occurred on May 14, 2006 in Florence resulting in $1.3 million in losses, and on May 11, 2008 in Yonges Island, Charleston County resulting in $1.2 million in damages. The most injurious events occurred on January 5, 2007 in Liberty, Pickens County when an EF1 tornado touched down at the local elementary school, injuring 15 in Manning on January 13, 2006.

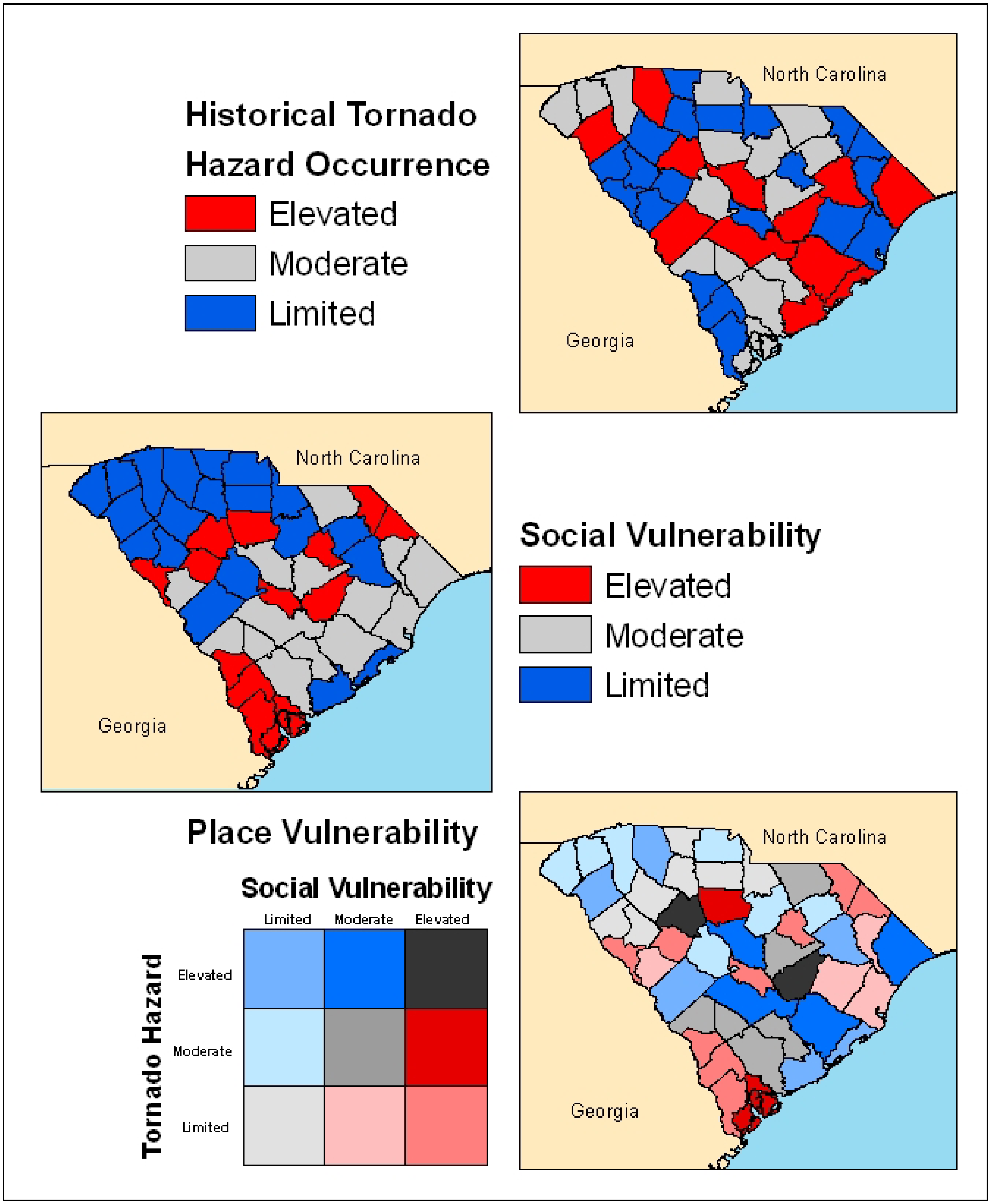

Figure 5.26: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Tornado Hazard

Table 5.19: Counties Ranked by Place Vulnerability for Tornado Hazard

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Orangeburg	1.131	0.36	79.66	1.00	1.362
2	Newberry	2.742	0.53	50.85	0.56	1.092
3	Saluda	7.315	1.00	16.95	0.05	1.051
4	Horry	0.433	0.29	62.71	0.74	1.033
5	Clarendon	3.118	0.57	42.37	0.44	1.003
6	Dillon	5.769	0.84	23.73	0.15	0.994
7	Berkeley	1.78	0.43	49.15	0.54	0.967
8	Richland	0.435	0.29	57.63	0.67	0.956
9	Marlboro	4.797	0.74	23.73	0.15	0.894
10	Charleston	-1.265	0.11	64.41	0.77	0.883
11	McCormick	4.585	0.72	23.73	0.15	0.872
12	Beaufort	2.764	0.53	35.59	0.33	0.863
13	Chesterfield	1.955	0.45	37.29	0.36	0.806
14	Fairfield	2.133	0.46	33.90	0.31	0.773
15	Allendale	3.954	0.65	20.34	0.10	0.756
16	Lee	4.678	0.73	15.25	0.03	0.753
17	Florence	-0.927	0.15	52.54	0.59	0.739
18	Aiken	-1.372	0.10	54.24	0.62	0.718
19	Jasper	4.565	0.72	13.56	0.00	0.716
20	Hampton	2.939	0.55	22.03	0.13	0.676
21	Bamberg	1.401	0.39	28.81	0.23	0.620
22	Calhoun	2.635	0.52	20.34	0.10	0.619
23	Edgefield	1.657	0.42	25.42	0.18	0.595
24	Sumter	0.905	0.34	30.51	0.26	0.595
25	Colleton	0.393	0.29	32.20	0.28	0.567
26	Barnwell	1.045	0.35	27.12	0.21	0.558
27	Anderson	-2.3	0.01	45.76	0.49	0.494
28	Darlington	-0.573	0.19	33.90	0.31	0.493
29	Georgetown	1.143	0.36	22.03	0.13	0.491
30	Spartanburg	-2.179	0.02	44.07	0.46	0.481
31	York	-0.505	0.19	30.51	0.26	0.449
32	Dorchester	-0.072	0.24	27.12	0.21	0.442
33	Greenville	-1.646	0.07	37.29	0.36	0.434
34	Kershaw	-2.036	0.03	38.98	0.38	0.419
35	Lexington	-2.081	0.03	37.29	0.36	0.389
36	Pickens	-2.082	0.03	37.29	0.36	0.389
37	Williamsburg	0.122	0.26	22.03	0.13	0.386
38	Oconee	-2.27	0.01	37.29	0.36	0.369
39	Abbeville	-1.054	0.14	23.73	0.15	0.290
40	Laurens	-0.961	0.15	20.34	0.10	0.248
41	Marion	0.011	0.25	13.56	0.00	0.246
42	Cherokee	-1.769	0.06	25.42	0.18	0.242
43	Greenwood	-1.55	0.08	23.73	0.15	0.239
44	Chester	-1.357	0.10	20.34	0.10	0.207
45	Lancaster	-1.657	0.07	15.25	0.03	0.099
46	Union	-2.37	0.00	18.64	0.08	0.077

5.9 Temperature Extremes

Historical extreme temperature hazard data is represented by the number of documented incidents per county from 1993 – 2008 with either excessive heat or extreme cold. Charleston and Chester Counties have the highest frequency of occurrence of extreme temperature events, followed by Dorchester, Greenville, Spartanburg, and Anderson (Table 5.20). Regionally, the distribution of the temperature extremes hazard is concentrated in southern coastal portion of the state and in the Upstate (Figure 5.27 top).

The highest Social Vulnerability scores were in Saluda, Dillon, Marlboro, Lee, and McCormick Counties. The middle choropleth map in Figure 5.27 represents the Social Vulnerability scores for the state (see section 3.1).

The counties displaying the greatest place vulnerability to the temperature extreme hazards are concentrated within Jasper, Beaufort, Allendale, Berkeley, Hampton, and Dorchester (Figure 5.27 bottom). For Jasper, Beaufort, Allendale, and Hampton Counties, elevated levels of temperature extreme occurrences combined with elevated social vulnerability produce the highest place vulnerability scores. Priority for planning and mitigation should be directed to these four counties. For Colleton, Dorchester, and Berkeley, and Charleston, the place vulnerability scores are damped by the moderate to limited social vulnerability, which is also the case in the Upstate counties.

Since 2006, there have been 5 extreme temperature events, all caused by extreme heat, reported in South Carolina, causing one fatality, zero injuries, and zero dollars in property damage. The only death in this time period occurred in Columbia, in Richland County when a man passed out while working at a garbage-removal business from complications from heat stroke. The excessive heat pushed the heat index over 100°F.

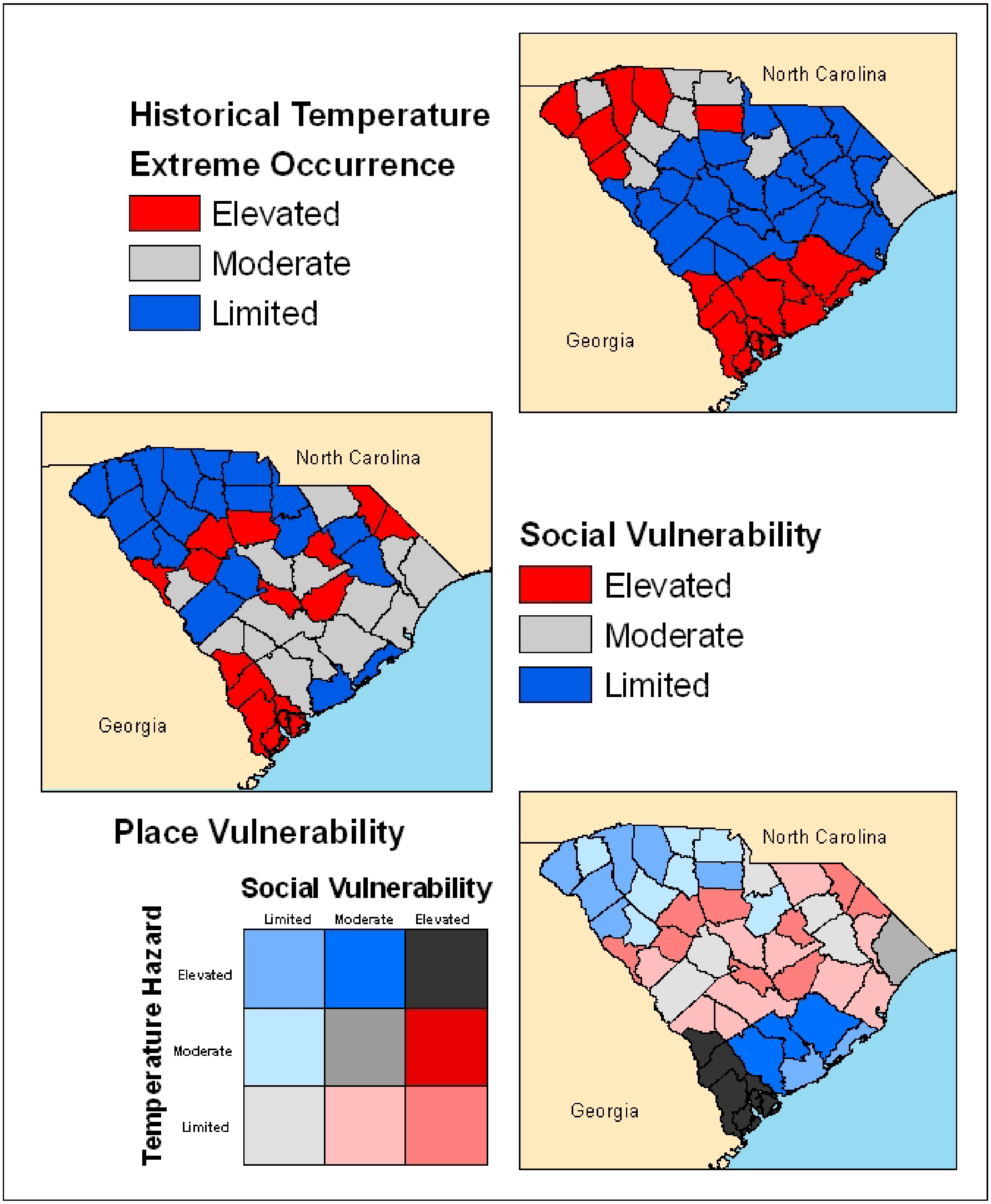

Figure 5.27: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Temperature Extreme Hazards

Table 5.20: Counties Ranked by Place Vulnerability for Temperature Extreme Hazards

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Jasper	4.565	0.72	50.00	0.80	1.516
2	Beaufort	2.764	0.53	50.00	0.80	1.330
3	Allendale	3.954	0.65	37.50	0.60	1.253
4	Berkeley	1.78	0.43	50.00	0.80	1.228
5	Hampton	2.939	0.55	37.50	0.60	1.148
6	Dorchester	-0.072	0.24	56.25	0.90	1.137
7	Charleston	-1.265	0.11	62.50	1.00	1.114
8	Chester	-1.357	0.10	62.50	1.00	1.105
9	Colleton	0.393	0.29	50.00	0.80	1.085
10	Saluda	7.315	1.00	0.00	0.00	1.000
11	Greenville	-1.646	0.07	56.25	0.90	0.975
12	Spartanburg	-2.179	0.02	56.25	0.90	0.920
13	Anderson	-2.3	0.01	56.25	0.90	0.907
14	Dillon	5.769	0.84	0.00	0.00	0.840
15	Marlboro	4.797	0.74	0.00	0.00	0.740
16	Abbeville	-1.054	0.14	37.50	0.60	0.736
17	Lee	4.678	0.73	0.00	0.00	0.728
18	McCormick	4.585	0.72	0.00	0.00	0.718
19	Oconee	-2.27	0.01	43.75	0.70	0.710
20	York	-0.505	0.19	31.25	0.50	0.693
21	Horry	0.433	0.29	25.00	0.40	0.689
22	Clarendon	3.118	0.57	6.25	0.10	0.667
23	Laurens	-0.961	0.15	31.25	0.50	0.645
24	Greenwood	-1.55	0.08	31.25	0.50	0.585
25	Fairfield	2.133	0.46	6.25	0.10	0.565
26	Newberry	2.742	0.53	0.00	0.00	0.528
27	Calhoun	2.635	0.52	0.00	0.00	0.517
28	Georgetown	1.143	0.36	6.25	0.10	0.463
29	Orangeburg	1.131	0.36	6.25	0.10	0.461
30	Chesterfield	1.955	0.45	0.00	0.00	0.447
31	Pickens	-2.082	0.03	25.00	0.40	0.430
32	Edgefield	1.657	0.42	0.00	0.00	0.416
33	Union	-2.37	0.00	25.00	0.40	0.400
34	Richland	0.435	0.29	6.25	0.10	0.390
35	Bamberg	1.401	0.39	0.00	0.00	0.389
36	Cherokee	-1.769	0.06	18.75	0.30	0.362
37	Barnwell	1.045	0.35	0.00	0.00	0.353
38	Sumter	0.905	0.34	0.00	0.00	0.338
39	Kershaw	-2.036	0.03	18.75	0.30	0.334
40	Williamsburg	0.122	0.26	0.00	0.00	0.257
41	Florence	-0.927	0.15	6.25	0.10	0.249
42	Marion	0.011	0.25	0.00	0.00	0.246
43	Aiken	-1.372	0.10	6.25	0.10	0.203
44	Darlington	-0.573	0.19	0.00	0.00	0.186
45	Lancaster	-1.657	0.07	0.00	0.00	0.074
46	Lexington	-2.081	0.03	0.00	0.00	0.030

5. 10 Fire

5.10.1 Wildfire

Data analyzed for this hazard represents the incidents of wildfires per county from 1988 – 2008. Many of the coastal and inner coastal counties in the state fall within the elevated category for the wildfire hazard, with Berkeley and Williamsburg showing the highest wildfire occurrences within the state, followed by Orangeburg, Colleton, and Lexington Counties (Table 5.21). Regionally, elevated occurrences of wildfires are concentrated in the central portion of the state stretching from the Georgia to North Carolina border (Figure 5.28 top). Jasper and Colleton are also in the elevated category.

The highest Social Vulnerability scores were in Saluda, Dillon, Marlboro, Lee, and McCormick Counties. The middle choropleth map in Figure 5.28 represents the Social Vulnerability scores for the state (see section 3.1).

Those counties that fall in the highest range for Place Vulnerability for the wildfire hazard are all located in the midlands or the coastal plain and include Berkeley, Williamsburg, Jasper, Clarendon, and Orangeburg. When examining both the elevated occurrences and the social vulnerability, Clarendon and Jasper County end up in the highest category suggesting that planning and mitigation for wildfires should be a priority for these two counties. The place vulnerability for other counties in the elevated hazard occurrence category is offset by limited to moderate levels of vulnerability (Figure 5.28 bottom).

There have been nearly 3,500 wildfires since 2006 in South Carolina. These fires occurred in every county in the state and impacted roughly 54,920 acres of land. Nine counties each had more than three hundred wildfires during this time period. These counties and their respective number of wildfires are: Williamsburg (632), Orangeburg (572), Florence (489), Berkeley (440), Aiken (434), Colleton (393), Horry (389), Chesterfield (313), and Darlington (300).

5.10.2 Structural Fires

Data are not available at this time.

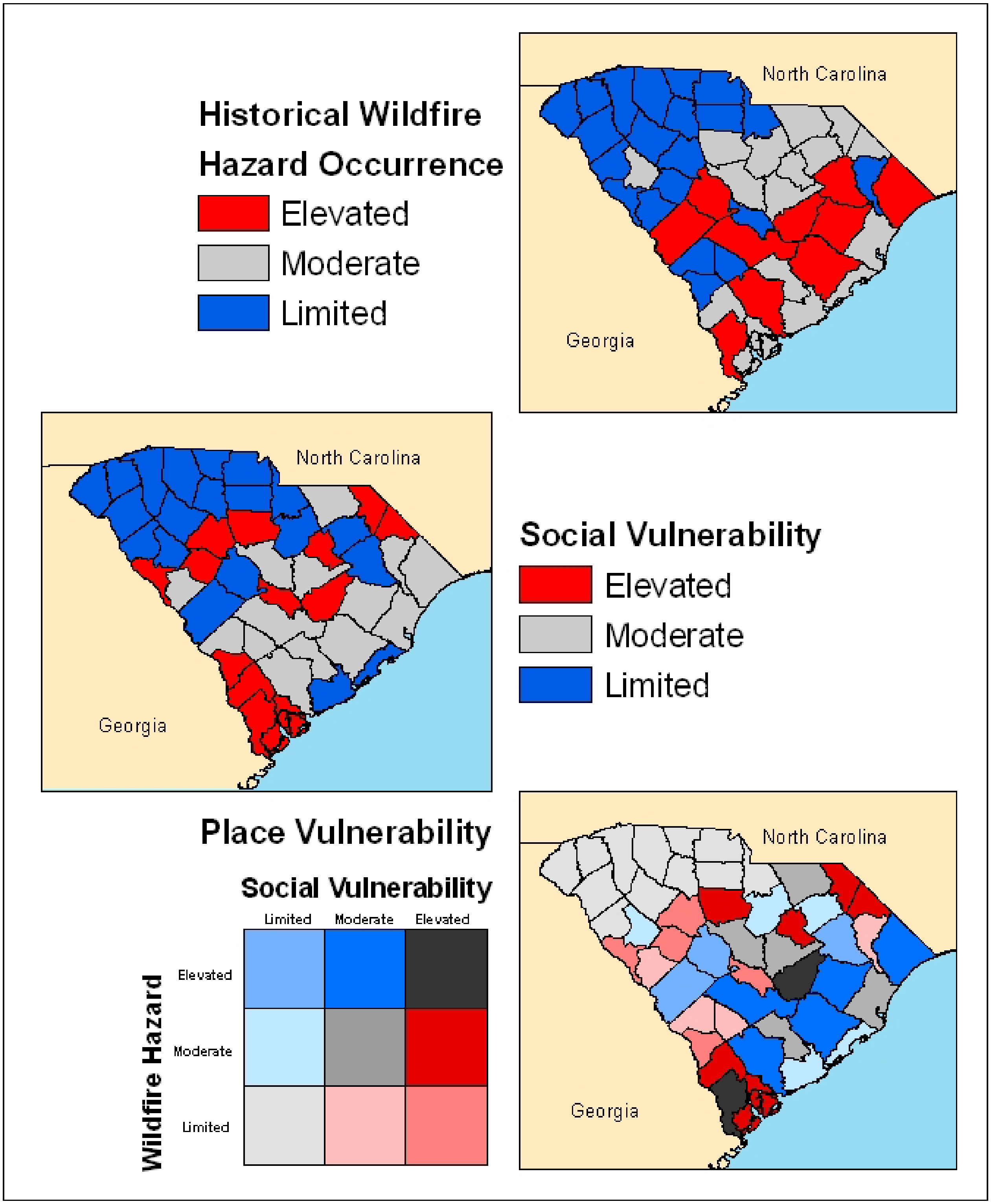

Figure 5.28: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Wildfire Hazard

Table 5.21: Counties Ranked by Place Vulnerability for Wildfire Hazard

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Berkeley	1.78	0.43	28,638.10	0.92	1.347
2	Williamsburg	0.122	0.26	30,895.24	1.00	1.257
3	Jasper	4.565	0.72	15,628.57	0.45	1.168
4	Clarendon	3.118	0.57	16,757.14	0.49	1.059
5	Orangeburg	1.131	0.36	22,395.24	0.69	1.056
6	Saluda	7.315	1.00	3,342.86	0.01	1.010
7	Dillon	5.769	0.84	6,714.29	0.13	0.972
8	Colleton	0.393	0.29	20,904.76	0.64	0.926
9	Lee	4.678	0.73	7,919.05	0.17	0.902
10	Marlboro	4.797	0.74	7,461.90	0.16	0.898
11	Horry	0.433	0.29	17,161.90	0.51	0.796
12	Chesterfield	1.955	0.45	12,704.76	0.35	0.793
13	Florence	-0.927	0.15	19,671.43	0.60	0.746
14	Hampton	2.939	0.55	8,338.10	0.19	0.738
15	McCormick	4.585	0.72	3,409.52	0.01	0.731
16	Sumter	0.905	0.34	12,676.19	0.35	0.684
17	Beaufort	2.764	0.53	7,180.95	0.15	0.678
18	Georgetown	1.143	0.36	11,523.81	0.30	0.667
19	Lexington	-2.081	0.03	20,671.43	0.63	0.663
20	Allendale	3.954	0.65	3,057.14	0.00	0.653
21	Fairfield	2.133	0.46	6,409.52	0.12	0.585
22	Aiken	-1.372	0.10	16,314.29	0.48	0.579
23	Calhoun	2.635	0.52	4,438.10	0.05	0.566
24	Newberry	2.742	0.53	3,733.33	0.02	0.552
25	Dorchester	-0.072	0.24	11,728.57	0.31	0.549
26	Darlington	-0.573	0.19	11,428.57	0.30	0.486
27	Richland	0.435	0.29	8,061.90	0.18	0.469
28	Bamberg	1.401	0.39	4,642.86	0.06	0.446
29	Edgefield	1.657	0.42	3,209.52	0.01	0.421
30	Barnwell	1.045	0.35	4,547.62	0.05	0.406
31	Charleston	-1.265	0.11	9,728.57	0.24	0.354
32	Kershaw	-2.036	0.03	10,633.33	0.27	0.307
33	Marion	0.011	0.25	4,323.81	0.05	0.291
34	York	-0.505	0.19	4,233.33	0.04	0.235
35	Abbeville	-1.054	0.14	5,409.52	0.08	0.220
36	Laurens	-0.961	0.15	5,019.05	0.07	0.216
37	Greenwood	-1.55	0.08	6,428.57	0.12	0.206
38	Chester	-1.357	0.10	4,242.86	0.04	0.147
39	Cherokee	-1.769	0.06	5,423.81	0.09	0.147
40	Greenville	-1.646	0.07	5,028.57	0.07	0.146
41	Lancaster	-1.657	0.07	4,352.38	0.05	0.120
42	Pickens	-2.082	0.03	5,561.90	0.09	0.120
43	Spartanburg	-2.179	0.02	5,171.43	0.08	0.096
44	Anderson	-2.3	0.01	4,547.62	0.05	0.061
45	Oconee	-2.27	0.01	4,114.29	0.04	0.048
46	Union	-2.37	0.00	3,671.43	0.02	0.022

5.11 Winter Weather (Snow & Ice)

Data analyzed for the winter storm hazard represents a compilation of reported ice, sleet, and snow events per county from 1950 – 2008. Greenville had the highest number of reported events (72), with Oconee and Pickens in second and third with 71 and 68 events respectfully (Table 5.22). As expected, a line of counties from Oconee to York in the northernmost portion of the state fell into the elevated category of historical hazard occurrences (Figure 5.29 top).

The highest Social Vulnerability scores were in Saluda, Dillon, Marlboro, Lee, and McCormick Counties. The middle choropleth map in Figure 5.29 represents the Social Vulnerability scores for the state (see section 3.1).

Counties with the highest Place Vulnerability scores for the winter storm hazard are Saluda, Greenville, Dillon, and Oconee Counties, as well as, many of the counties in the Upstate. Saluda and Dillon County's ranking are more a function of their elevated social vulnerability, rather than the frequency of occurrence of winter hazards. While the Upstate counties have elevated levels of occurrence, the limited social vulnerability reduces the overall place vulnerability. However, counties in the elevated and moderate categories consider a winter storm a priority for planning and mitigation. For example, the 2000 winter storm resulted in a Presidential Disaster Declaration for 38 of South Carolina's 46 counties including Georgetown and Charleston counties.

There have been five winter events in South Carolina since 2006. These winter storms account for no fatalities or injuries and $1.015 million in property damage (NCDC Storm Data Online, 2009). On January 18, 2007, there was widespread light precipitation, mainly in the form of freezing rain. This produced light ice accretion mainly across the foothills and piedmont during the morning hours. There were some slick spots on bridges and overpasses in Lancaster, Newberry, and Fairfield Counties, causing $15 thousand dollars in damage. In April 2007, a late season frost/freeze spread across the upstate causing nearly $1 million in crop damage (NCDC Storm Data, 2009).

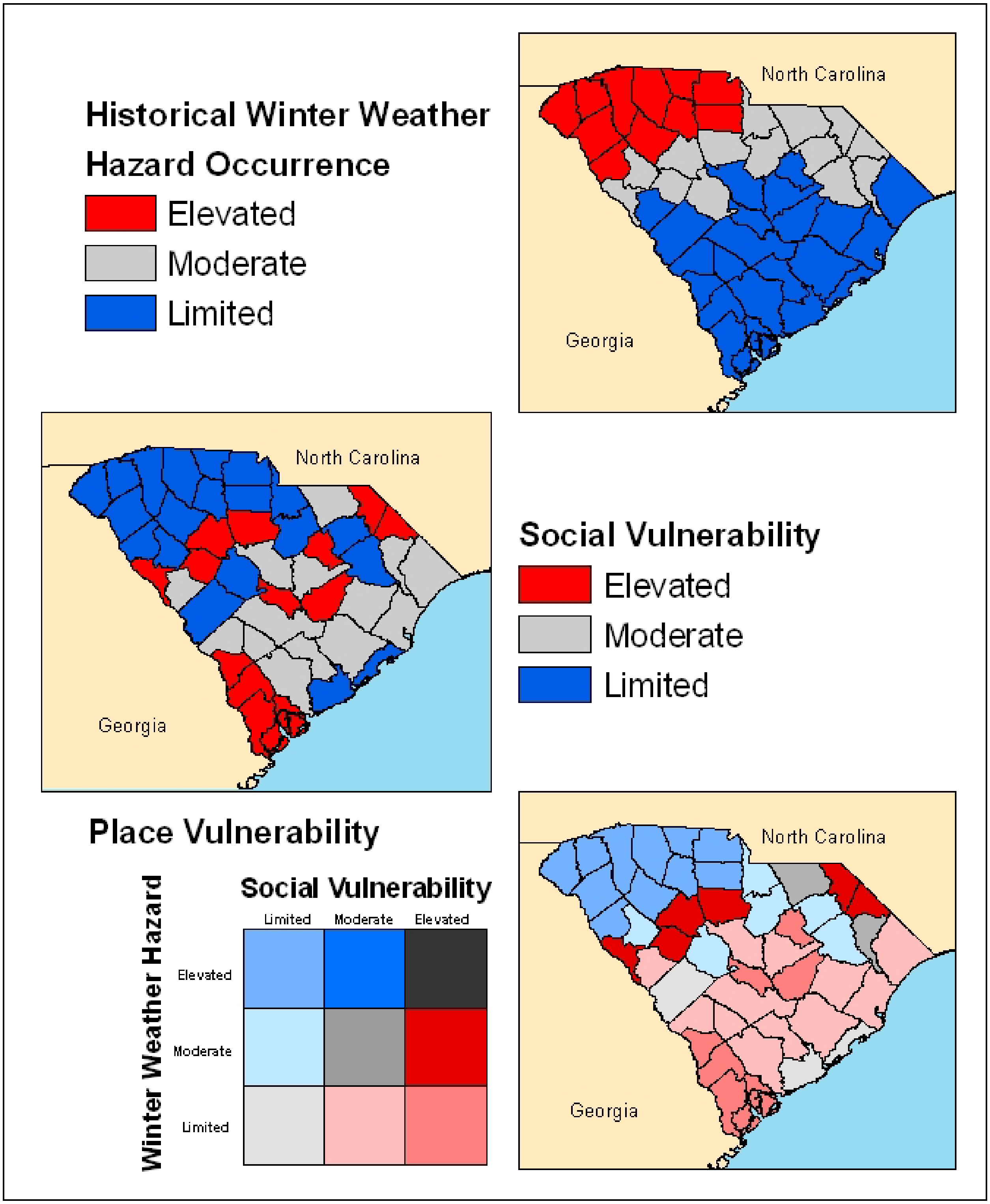

Figure 5.29: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Winter Weather Hazards

Table 5.22: Counties Ranked by Place Vulnerability for Winter Weather Hazards

Rank	County	SoVI Score	Standardized SoVI Score	Hazard Score	Standardized Hazard Score	Place Vulnerability Score
1	Saluda	7.315	1.00	11.86	0.08	1.082
2	Greenville	-1.646	0.07	125.42	1.00	1.075
3	Dillon	5.769	0.84	18.64	0.14	0.977
4	Oconee	-2.27	0.01	120.34	0.96	0.969
5	Pickens	-2.082	0.03	115.25	0.92	0.948
6	Marlboro	4.797	0.74	25.42	0.19	0.932
7	McCormick	4.585	0.72	13.56	0.10	0.814
8	Lee	4.678	0.73	10.17	0.07	0.796
9	Spartanburg	-2.179	0.02	91.53	0.73	0.746
10	Cherokee	-1.769	0.06	84.75	0.67	0.733
11	Jasper	4.565	0.72	1.69	0.00	0.716
12	Allendale	3.954	0.65	5.08	0.03	0.680
13	Newberry	2.742	0.53	20.34	0.15	0.679
14	Chester	-1.357	0.10	67.80	0.53	0.639
15	Chesterfield	1.955	0.45	23.73	0.18	0.625
16	Clarendon	3.118	0.57	8.47	0.05	0.621
17	Fairfield	2.133	0.46	20.34	0.15	0.616
18	York	-0.505	0.19	52.54	0.41	0.604
19	Calhoun	2.635	0.52	8.47	0.05	0.572
20	Hampton	2.939	0.55	3.39	0.01	0.562
21	Beaufort	2.764	0.53	1.69	0.00	0.530
22	Anderson	-2.3	0.01	66.10	0.52	0.528
23	Laurens	-0.961	0.15	45.76	0.36	0.502
24	Abbeville	-1.054	0.14	44.07	0.34	0.478
25	Edgefield	1.657	0.42	8.47	0.05	0.471
26	Berkeley	1.78	0.43	6.78	0.04	0.470
27	Bamberg	1.401	0.39	6.78	0.04	0.431
28	Sumter	0.905	0.34	10.17	0.07	0.407
29	Orangeburg	1.131	0.36	6.78	0.04	0.403
30	Barnwell	1.045	0.35	6.78	0.04	0.394
31	Georgetown	1.143	0.36	5.08	0.03	0.390
32	Greenwood	-1.55	0.08	37.29	0.29	0.372
33	Richland	0.435	0.29	10.17	0.07	0.358
34	Union	-2.37	0.00	45.76	0.36	0.356
35	Darlington	-0.573	0.19	20.34	0.15	0.336
36	Horry	0.433	0.29	6.78	0.04	0.331
37	Marion	0.011	0.25	11.86	0.08	0.328
38	Colleton	0.393	0.29	6.78	0.04	0.326
39	Williamsburg	0.122	0.26	10.17	0.07	0.326
40	Dorchester	-0.072	0.24	6.78	0.04	0.278
41	Lancaster	-1.657	0.07	25.42	0.19	0.265
42	Florence	-0.927	0.15	15.25	0.11	0.259
43	Kershaw	-2.036	0.03	18.64	0.14	0.172
44	Charleston	-1.265	0.11	6.78	0.04	0.155
45	Aiken	-1.372	0.10	6.78	0.04	0.144
46	Lexington	-2.081	0.03	11.86	0.08	0.112

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APPENDICES

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APPENDIX I – Methods and Metrics for Determining and Understanding Social Vulnerability

Appendix Table 1.1: Variables and input data for the Social Vulnerability Index

Name	Variable	Source	Equation (Using Census Variables)
MEDAGE00	Median Age 2000	Census Data Engine SF1	[P013001]
QBLACK00	Percent African American 2000	Census Data Engine SF1	((Total African Americans [P003004]) / (Total Population [P001001])) * 100
QINDIAN00	Percent Native American 2000	Census Data Engine SF1	((Total American Indian or Alaska Natives [P003005]) / (Total Population [P001001])) * 100
QASIAN00	Percent Asian and Hawaiian Islanders 2000	Census Data Engine SF1	((Asian [P003006] + Native Hawaiian [P003007]) / (Total Population [P001001])) * 100
QSPANISH00	Percent Hispanic 2000	Census Data Engine SF1	((Total Hispanic [P004002]) / (Total Population [P001001])) * 100
QKIDS00	Percent of population under 5 yrs of age 2000	Census Data Engine SF1	((Total Population Under Age 5 [P012003] + [P012027]) / (Total Population [P001001]) * 100
QPOP65O00	Percent of population 65 and over 2000	Census Data Engine SF1	((Total population over age 65 [P012020] + [P012021] + [P012022] + [P012023] + [P012024] + [P012025] + [P012044] + [P012045] + [P012046] + [P012047] + [P012048] + [P012049]) / (Total population [P001001])) * 100
PPUNIT00	Average number of people per household 2000	Census Data Engine SF1	(Total number of people in occupied housing units H010001) / (Total Housing Units H001001)
QRENTER00	Percent renter occupied housing units 2000	Census Data Engine SF1	((Total Renter Occupied Housing Units [H004003]) / (Total Occupied Housing Units [H001001])) *100
NRRESPC00	Per capita residents in nursing homes 1991	Census Data Engine SF1	((Total number of residents in nursing homes [P038006] +[P038015] +[P038024] +[P038034] +[P038043] +[P038052]) / (Total Population [P001001]))
QFEMALE00	Percent female population 2000	Census Data Engine SF1	((Total number of females [P012026]) / (Total Population [P001001])) * 100
QFHH00	Percent female headed households, no spouse present 2000	Census Data Engine SF1	((Total number of female headed households [H017047] + [H017013]) / Total Households [H017001])) * 100

HOSPTPC00	Per capita number of community hospitals 1997	Census Data Engine SF1 / GNIS US Hospitals	(Total number of hospitals (GNIS US Hospitals - Converted X, Y data to point files in GIS. Automatically counted points per census tract.) / (Total Population [P001001]) (Citation)
HODENT00	Number of housing units per square mile 2000	Census Data Engine SF1/ ArcMAP 9.3	(Total number of housing units[H001001] / Land Area in Square Miles ('Calculate Geometry' Function in ArcMAP 9.3)
PERCAP00	Per Capita Income (in dollars) 2000	Census Data Engine SF3	[P082001]
MHSEVAL00	Mean Value of Owner Occupied Housing Units 2000	Census Data Engine SF3	(Aggregate House Value [H086001]) / (Owner Occupied Housing Units [H007002])
M_C_RENT00	Mean Contract Rent 2000	Census Data Engine SF3	(Aggregate Contract Rent [H058001]) / (Renter Occupied Housing Units ([H007003])
PHYSICN00	Number persons per 100,000 population employed as healthcare practitioners and technical occupations 2000	Census Data Engine SF3	(Total number of persons employed as healthcare practitioners and technical healthcare occupations [P050020] + [P050067]) / (Total Population [P001001]) / 100000)
MIGRA00	Foreign Born (born 1990- March 2000)	Census Data Engine SF3	((Total number of persons immigrating from 1990-2000 ([P022002] + [P022003]) / Total number of foreign born persons ([P021013])) * 100
QCVLUN00	Percent civilian unemployment 2000	Census Data Engine SF3	((Total number of people in the civilian labor force unemployed [P0043007] + [P0043014]) / (Total number of people in the civilian labor force [P0043005] + [P0043012])) * 100
QRICH00	Percent of households earning $100,000 or more 2000	Census Data Engine SF3	((Total number of households with income over 100,000 [P052014]+ [P052015] + [P052016] + [P052017]) / (Total number of households with income P052001)) * 100
QPOVTY00	Percent living below poverty level 2000	Census Data Engine SF3	(Total number of people with income below poverty level [P087002]) / Total Population [P001001])) * 100
QRFRM00	Percent rural farm population 2000	Census Data Engine SF3	((Total Farm Population [P005006]) / (Total Population [P001001])) * 100

QMOHO00	Percent of housing units that are mobile homes 2000	Census Data Engine SF3	((Total number of mobile homes [H030010]) / Total Housing Units [H001001])) * 100
QED12LES00	Percent of population 25 years or older with no high school diploma 2000	Census Data Engine SF3	((Total number of people over 25 with less than a high school diploma [P037003]+[P037004]+[P037005]+[P037006]+[P037007]+[P037008]+[P037009]+[P037010]+[P037020]+[P037021]+[P037022]+[P037023]+[P037024]+[P037025]+[P037026]+[P037027]) / (Total population over age 25([P008026]+[P008027]+[P008028]+[P008029]+[P008030]+[P008031]+[P008032]+[P008033]+[P008034]+[P008035]+[P008036]+[P008037]+[P008038]+[P008039]+[P008040]+[P008065]+[P008066]+[P008067]+[P008068]+[P008069]+[P008070]+[P008071]+[P008072]+[P008073]+[P008074]+[P008075]+[P008076]+[P008077]+[P008078]+[P008079])) * 100
QCVLBR00	Percent of population participating in the labor force 2000	Census Data Engine SF3	((Total number of people in civilian labor force [P043005] + [P043012]) / (Total Population [P001001])) * 100
QFEMLBR00	Percent females participating in the labor force 2000	Census Data Engine SF3	((Total number of females in civilian labor force [P043012]) / (Total number of people in the Civilian Labor Force [P043005] + [P043012])) * 100
QAGRI00	Percent employment in farming, fishing, and forestry occupations 2000	Census Data Engine SF3	((Total number of persons employed in Agriculture, Forestry, Hunting, Fishing and Mining Industries [P049003] + [P049030]) / (Total number of people in the Civilian Labor Force [P043005] + [P043012])) * 100
QTRAN00	Percent employed in transportation, communications, and other public utilities 2000	Census Data Engine SF3	((Total number of persons employed in transportation, warehousing and utilities industry [P049010] + [P049037]) / (Total number of people in the Civilian Labor Force [P043005] + [P043012])) * 100
QSERV00	Percent Employed in service industry 2000	Census Data Engine SF3	(Total number of persons employed in the service industry ([P050023] + [P050070]) / Total number of people in the Civilian Labor Force ([P043005] + [P043012])) * 100
QURBAN00	Percent urban population 2000	Census Data Engine SF3	((Total number of persons living in urban areas [P005002]) / (Total Population [P001001])) * 100

QSSBEN00	Percent of population collecting social security benefits 2000	Census Data Engine SF3	((Total number of social security recipients [P062002]) / (Total population [P001001])) * 100

APPENDIX II – County Rankings

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Appendix Table 2.1: Counties Ranked by Hazard Frequency

Rank	County	Total Hazards	Hurricane/ Tropical Storm	Ocean & Lake Surf	Waterspout	Dam	Drought	Flood	Fog
1	McCormick	7520	23	1	0	-	21	41	0
2	Lancaster	6705	19	1	0	-	8	5	0
3	Abbeville	5562	26	1	0	-	1	8	0
4	Clarendon	5415	20	13	17	-	20	77	0
5	Florence	5168	9	1	0	-	1	17	0
6	Orangeburg	4926	23	10	1	-	21	14	0
7	Richland	4669	8	1	0	-	9	13	1
8	Laurens	4515	19	13	6	-	7	31	1
9	Dillon	4014	5	1	0	-	1	6	0
10	Charleston	3822	15	1	0	-	1	8	0
11	Edgefield	3531	18	4	1	-	21	10	0
12	Georgetown	3207	14	1	0	-	21	22	0
13	Lexington	3087	15	1	0	-	1	6	0
14	Greenville	3009	17	7	6	-	7	17	0
15	Newberry	2933	12	1	0	-	1	11	0
16	Fairfield	2781	8	1	0	-	9	6	0
17	Sumter	2667	10	1	0	-	1	9	0
18	Oconee	2551	17	1	0	-	1	23	0
19	Barnwell	2380	2	1	0	-	34	89	6
20	Aiken	2359	4	2	0	-	33	62	4
21	Lee	2325	20	10	2	-	21	25	0
22	Chesterfield	2182	10	1	0	-	1	3	0
23	Bamberg	2002	13	1	0	-	21	5	0
24	Williamsburg	1874	11	1	0	-	1	6	0
25	Marion	1804	13	1	0	-	11	6	0
26	Dorchester	1802	4	1	0	-	33	17	4
27	Marlboro	1800	2	1	0	-	33	40	4
28	Cherokee	1784	2	1	0	-	33	39	6
29	Hampton	1676	4	1	0	-	33	17	4
30	Kershaw	1671	7	0	0	-	31	17	3
31	Calhoun	1664	6	1	0	-	4	6	0
32	York	1598	5	1	0	-	33	29	3
33	Pickens	1537	1	1	0	-	33	22	5
34	Saluda	1441	2	1	0	-	33	14	3
35	Horry	1315	6	1	0	-	51	18	3
36	Allendale	1201	14	1	0	-	1	6	0
37	Beaufort	1193	15	1	0	-	1	7	0
38	Berkeley	1189	12	1	0	-	1	7	0
39	Spartanburg	1159	7	1	0	-	1	10	0
40	Anderson	1145	13	1	0	-	8	9	0
41	Union	1121	5	1	0	-	33	21	3
42	Darlington	1111	6	1	0	-	1	6	0
43	Greenwood	956	4	1	0	-	1	4	0
44	Chester	879	4	1	0	-	1	4	0
45	Colleton	867	3	1	0	-	1	3	0
46	Jasper	843	15	1	0	-	21	3	0

Appendix Table 2.1: Counties Ranked by Hazard Frequency (continued)

Rank	County	Total Hazards	Avalanche	Earthquake	Landslide	Civil Disorder	HAZMAT	Nuclear Power Plant
1	McCormick	7520	0	540	0	-	440	0
2	Lancaster	6705	0	0	0	-	32	0
3	Abbeville	5562	0	20	0	-	374	0
4	Clarendon	5415	0	34	0	-	2685	0
5	Florence	5168	0	6	0	-	274	0
6	Orangeburg	4926	0	2	0	-	95	0
7	Richland	4669	0	1	1	-	183	0
8	Laurens	4515	1	0	0	-	423	0
9	Dillon	4014	0	6	0	-	178	0
10	Charleston	3822	0	1	0	-	34	0
11	Edgefield	3531	0	0	0	-	55	0
12	Georgetown	3207	0	192	0	-	170	0
13	Lexington	3087	0	1	0	-	142	0
14	Greenville	3009	0	2	0	-	341	0
15	Newberry	2933	0	2	0	-	47	0
16	Fairfield	2781	0	0	0	-	99	0
17	Sumter	2667	0	3	0	-	154	0
18	Oconee	2551	0	18	0	-	328	0
19	Barnwell	2380	0	7	0	-	489	1
20	Aiken	2359	0	4	0	-	474	0
21	Lee	2325	0	1	0	-	435	0
22	Chesterfield	2182	0	555	0	-	77	0
23	Bamberg	2002	0	0	0	-	42	0
24	Williamsburg	1874	0	1	0	-	57	0
25	Marion	1804	0	2	0	-	28	0
26	Dorchester	1802	0	3	0	-	103	0
27	Marlboro	1800	0	46	0	-	178	0
28	Cherokee	1784	0	5	0	-	132	0
29	Hampton	1676	0	0	0	-	155	0
30	Kershaw	1671	0	1	0	-	358	0
31	Calhoun	1664	0	0	0	-	54	0
32	York	1598	0	6	0	-	84	0
33	Pickens	1537	0	13	0	-	178	0
34	Saluda	1441	0	12	0	-	22	0
35	Horry	1315	0	7	0	-	102	0
36	Allendale	1201	0	2	0	-	81	0
37	Beaufort	1193	0	3	0	-	28	0
38	Berkeley	1189	0	6	0	-	43	0
39	Spartanburg	1159	0	0	0	-	40	0
40	Anderson	1145	0	9	0	-	23	0
41	Union	1121	0	4	0	-	37	0
42	Darlington	1111	0	21	0	-	57	0
43	Greenwood	956	0	2	0	-	87	0
44	Chester	879	0	0	0	-	44	0
45	Colleton	867	0	3	0	-	38	0
46	Jasper	843	0	2	0	-	35	0

Appendix Table 2.1: Counties Ranked by Hazard Frequency (continued)

Rank	County	Total Hazards	Terrorism	Transportation	Funnel Cloud	Hail	Heavy Precipitation	Lightning
1	McCormick	7520	0	27051	4	189	1	9
2	Lancaster	6705	0	6136	0	56	3	3
3	Abbeville	5562	0	21793	0	134	1	9
4	Clarendon	5415	0	108881	6	175	1	17
5	Florence	5168	0	53758	2	168	0	7
6	Orangeburg	4926	0	9331	2	89	0	2
7	Richland	4669	0	35885	1	102	6	16
8	Laurens	4515	0	70843	3	133	9	26
9	Dillon	4014	0	29249	1	123	0	11
10	Charleston	3822	0	6153	0	90	0	6
11	Edgefield	3531	0	7999	2	26	0	0
12	Georgetown	3207	0	21230	2	98	0	11
13	Lexington	3087	0	20920	0	72	1	1
14	Greenville	3010	2	11111	2	49	19	17
15	Newberry	2933	0	6528	0	54	0	3
16	Fairfield	2781	0	13205	1	78	7	5
17	Sumter	2667	0	10571	0	75	1	2
18	Oconee	2551	0	94120	2	147	1	10
19	Barnwell	2380	0	101383	3	210	12	17
20	Aiken	2359	0	59473	5	199	11	32
21	Lee	2325	0	27599	3	67	2	34
22	Chesterfield	2182	0	4556	0	46	0	0
23	Bamberg	2002	0	3150	0	33	0	2
24	Williamsburg	1874	0	3273	0	40	1	1
25	Marion	1804	0	5596	0	46	1	5
26	Dorchester	1802	0	14289	0	79	2	10
27	Marlboro	1800	0	36317	4	144	8	16
28	Cherokee	1784	0	18747	1	90	8	6
29	Hampton	1676	0	13038	2	80	4	13
30	Kershaw	1671	0	38398	0	95	5	21
31	Calhoun	1664	0	8304	0	53	1	2
32	York	1598	0	14116	3	89	32	7
33	Pickens	1537	0	11888	1	111	6	8
34	Saluda	1441	0	2979	0	56	0	8
35	Horry	1315	0	6426	1	60	1	0
36	Allendale	1201	0	3402	0	55	0	1
37	Beaufort	1193	0	2144	0	43	0	2
38	Berkeley	1189	0	3069	0	44	0	5
39	Spartanburg	1159	0	12235	2	54	0	8
40	Anderson	1145	0	5028	0	61	0	6
41	Union	1121	0	4820	0	64	0	7
42	Darlington	1111	0	7830	1	64	0	1
43	Greenwood	956	0	2956	1	47	0	0
44	Chester	879	0	2473	0	29	6	2
45	Colleton	867	0	3530	0	48	0	0
46	Jasper	843	0	2519	0	25	0	1

Appendix Table 2.1: Counties Ranked by Hazard Frequency (continued)

Rank	County	Total Hazards	Thunderstorm Wind	Tornado	Extreme Temperature	Wildfire	Winter Weather
1	McCormick	7520	196	29	8	6014	4
2	Lancaster	6705	71	13	0	6488	6
3	Abbeville	5562	233	47	1	4703	4
4	Clarendon	5415	255	38	10	2043	4
5	Florence	5168	313	22	0	4341	7
6	Orangeburg	4926	246	19	8	4390	4
7	Richland	4669	156	31	1	4131	9
8	Laurens	4515	194	37	4	3604	4
9	Dillon	4014	219	32	1	3426	4
10	Charleston	3822	116	25	1	3519	5
11	Edgefield	3531	95	8	8	3282	1
12	Georgetown	3207	184	16	9	2463	4
13	Lexington	3087	161	18	0	2662	6
14	Greenville	3009	88	13	1	2420	3
15	Newberry	2933	98	22	0	2668	14
16	Fairfield	2781	135	20	0	2400	12
17	Sumter	2667	141	23	3	2233	11
18	Oconee	2551	269	34	1	1693	6
19	Barnwell	2380	349	22	9	1056	74
20	Aiken	2359	354	26	9	1086	54
21	Lee	2325	167	21	8	1508	1
22	Chesterfield	2182	110	20	1	1346	12
23	Bamberg	2002	113	13	6	1751	2
24	Williamsburg	1874	77	9	0	1663	6
25	Marion	1804	95	14	0	1567	15
26	Dorchester	1802	155	14	5	1350	22
27	Marlboro	1800	294	27	9	955	39
28	Cherokee	1784	199	22	4	1168	68
29	Hampton	1676	156	15	3	1139	50
30	Kershaw	1671	189	18	5	889	31
31	Calhoun	1664	102	14	0	1410	11
32	York	1598	208	12	5	1054	27
33	Pickens	1537	194	22	7	864	71
34	Saluda	1441	108	14	6	1136	26
35	Horry	1315	112	12	10	891	40
36	Allendale	1201	91	12	0	932	5
37	Beaufort	1193	97	17	0	975	4
38	Berkeley	1189	95	16	0	955	4
39	Spartanburg	1159	98	9	0	914	15
40	Anderson	1145	92	8	0	908	7
41	Union	1121	133	11	4	771	27
42	Darlington	1111	127	30	0	784	12
43	Greenwood	956	90	10	0	702	7
44	Chester	879	50	14	0	716	8
45	Colleton	867	76	15	0	674	5
46	Jasper	843	77	12	6	642	3

Appendix Table 2.2: Counties Ranked by All Hazards Scores

Rank	County	Total All-Hazards Score	Hurricane/ Tropical Storm	Ocean & Lake Surf	Waterspout	Dam	Drought	Flood	Fog
1	Charleston	10.128	0.76	1.00	1.00	-	0.38	0.86	0.00
2	Greenville	9.576	0.04	0.00	0.00	-	0.66	1.00	1.00
3	Spartanburg	8.596	0.12	0.08	0.00	-	0.64	0.69	0.67
4	Berkeley	7.480	0.88	0.00	0.00	-	0.40	0.44	0.00
5	Horry	7.131	0.72	1.00	0.35	-	0.12	0.33	0.17
6	Anderson	6.713	0.04	0.00	0.00	-	0.64	0.43	0.67
7	Laurens	6.238	0.16	0.00	0.00	-	0.64	0.30	0.50
8	Beaufort	5.896	0.76	0.75	0.12	-	0.40	0.26	0.00
9	Colleton	5.395	0.88	0.75	0.06	-	0.40	0.13	0.00
10	Oconee	5.360	0.00	0.00	0.00	-	0.64	0.22	0.83
11	Pickens	5.351	0.04	0.00	0.00	-	0.64	0.42	1.00
12	Richland	5.074	0.64	0.00	0.00	-	0.00	0.23	0.00
13	Orangeburg	4.549	1.00	0.00	0.00	-	0.00	0.06	0.00
14	Dorchester	4.492	0.52	0.00	0.00	-	0.40	0.22	0.00
15	York	4.450	0.24	0.00	0.00	-	0.60	0.16	0.50
16	Cherokee	4.362	0.12	0.00	0.00	-	0.64	0.16	0.67
17	Chester	4.188	0.20	0.00	0.00	-	1.00	0.17	0.50
18	Georgetown	4.141	0.64	0.50	0.35	-	0.12	0.16	0.00
19	Lexington	3.840	0.32	0.00	0.00	-	0.00	0.16	0.00
20	Florence	3.771	0.28	0.00	0.00	-	0.16	0.12	0.17
21	Greenwood	3.682	0.12	0.00	0.00	-	0.64	0.16	0.67
22	Jasper	3.221	0.68	0.25	0.06	-	0.40	0.08	0.00
23	Abbeville	3.104	0.04	0.00	0.00	-	0.64	0.13	0.50
24	Aiken	3.073	0.16	0.00	0.00	-	0.00	0.03	0.00
25	Union	3.067	0.16	0.00	0.00	-	0.64	0.21	0.50
26	Williamsburg	2.502	0.72	0.00	0.00	-	0.14	0.02	0.00
27	Clarendon	2.452	0.56	0.00	0.00	-	0.00	0.06	0.00
28	Fairfield	2.370	0.36	0.00	0.00	-	0.00	0.00	0.00
29	Darlington	2.362	0.28	0.00	0.00	-	0.16	0.03	0.00
30	Kershaw	2.238	0.36	0.00	0.00	-	0.00	0.07	0.00
31	Barnwell	2.203	0.44	0.00	0.00	-	0.00	0.05	0.00
32	Hampton	2.152	0.48	0.00	0.00	-	0.40	0.02	0.00
33	Sumter	1.992	0.56	0.00	0.00	-	0.00	0.03	0.00
34	Chesterfield	1.833	0.44	0.00	0.00	-	0.00	0.09	0.00
35	Allendale	1.817	0.56	0.00	0.00	-	0.40	0.00	0.00
36	Newberry	1.685	0.20	0.00	0.00	-	0.00	0.03	0.00
37	Marlboro	1.665	0.48	0.00	0.00	-	0.20	0.03	0.00
38	Lancaster	1.476	0.24	0.00	0.00	-	0.00	0.08	0.00
39	Marion	1.343	0.48	0.00	0.00	-	0.14	0.07	0.00
40	Bamberg	1.254	0.56	0.00	0.00	-	0.00	0.05	0.00
41	Dillon	1.142	0.20	0.00	0.00	-	0.06	0.03	0.00
42	Calhoun	1.114	0.52	0.00	0.00	-	0.00	0.03	0.00
43	Lee	0.949	0.40	0.00	0.00	-	0.00	0.03	0.00
44	Saluda	0.721	0.12	0.00	0.00	-	0.00	0.01	0.00
45	McCormick	0.670	0.12	0.00	0.00	-	0.00	0.01	0.00
46	Edgefield	0.541	0.08	0.00	0.00	-	0.00	0.00	0.00

Appendix Table 2.2: Counties Ranked by All Hazards Scores (continued)

Rank	County	Total All-Hazards Score	Avalanche	Earthquake	Landslide	Civil Disorder	HAZMAT	Nuclear Power Plant
1	Charleston	10.128	0.00	0.06	0.00	-	1.00	0.00
2	Greenville	9.576	0.00	0.01	0.00	-	0.18	0.00
3	Spartanburg	8.596	0.00	0.01	0.00	-	0.17	0.00
4	Berkeley	7.480	0.00	0.97	0.00	-	0.16	0.00
5	Horry	7.131	0.00	0.00	0.00	-	0.15	0.00
6	Anderson	6.713	0.00	0.08	0.00	-	0.06	0.00
7	Laurens	6.238	1.00	0.01	0.00	-	0.02	0.00
8	Beaufort	5.896	0.00	0.00	0.00	-	0.16	0.00
9	Colleton	5.395	0.00	0.00	0.00	-	0.03	0.00
10	Oconee	5.360	0.00	0.02	0.00	-	0.06	0.00
11	Pickens	5.351	0.00	0.01	0.00	-	0.04	0.00
12	Richland	5.074	0.00	0.03	1.00	-	0.11	0.00
13	Orangeburg	4.549	0.00	0.04	0.00	-	0.13	0.00
14	Dorchester	4.492	0.00	0.35	0.00	-	0.06	0.00
15	York	4.450	0.00	0.00	0.00	-	0.13	0.00
16	Cherokee	4.362	0.00	0.00	0.00	-	0.05	0.00
17	Chester	4.188	0.00	0.01	0.00	-	0.03	0.00
18	Georgetown	4.141	0.00	0.00	0.00	-	0.12	0.00
19	Lexington	3.840	0.00	0.01	0.00	-	0.09	0.00
20	Florence	3.771	0.00	0.00	0.00	-	0.06	0.00
21	Greenwood	3.682	0.00	0.01	0.00	-	0.03	0.00
22	Jasper	3.221	0.00	0.00	0.00	-	0.01	0.00
23	Abbeville	3.104	0.00	0.02	0.00	-	0.00	0.00
24	Aiken	3.073	0.00	0.01	0.00	-	0.06	0.00
25	Union	3.067	0.00	0.01	0.00	-	0.01	0.00
26	Williamsburg	2.502	0.00	0.00	0.00	-	0.00	0.00
27	Clarendon	2.452	0.00	0.00	0.00	-	0.00	0.00
28	Fairfield	2.370	0.00	1.00	0.00	-	0.02	0.00
29	Darlington	2.362	0.00	0.00	0.00	-	0.03	0.00
30	Kershaw	2.238	0.00	0.01	0.00	-	0.05	0.00
31	Barnwell	2.203	0.00	0.01	0.00	-	0.01	1.00
32	Hampton	2.152	0.00	0.00	0.00	-	0.01	0.00
33	Sumter	1.992	0.00	0.00	0.00	-	0.05	0.00
34	Chesterfield	1.833	0.00	0.00	0.00	-	0.01	0.00
35	Allendale	1.817	0.00	0.00	0.00	-	0.00	0.00
36	Newberry	1.685	0.00	0.04	0.00	-	0.01	0.00
37	Marlboro	1.665	0.00	0.00	0.00	-	0.00	0.00
38	Lancaster	1.476	0.00	0.00	0.00	-	0.01	0.00
39	Marion	1.343	0.00	0.02	0.00	-	0.00	0.00
40	Bamberg	1.254	0.00	0.01	0.00	-	0.00	0.00
41	Dillon	1.142	0.00	0.00	0.00	-	0.01	0.00
42	Calhoun	1.114	0.00	0.00	0.00	-	0.02	0.00
43	Lee	0.949	0.00	0.00	0.00	-	0.01	0.00
44	Saluda	0.721	0.00	0.00	0.00	-	0.02	0.00
45	McCormick	0.670	0.00	0.00	0.00	-	0.01	0.00
46	Edgefield	0.541	0.00	0.01	0.00	-	0.01	0.00

Appendix Table 2.2: Counties Ranked by All Hazards Scores (continued)

Rank	County	Total All-Hazards Score	Terrorism	Transportation	Funnel Cloud	Hail	Heavy Precipitation	Lightning
1	Charleston	10.128	0.00	1.00	1.00	0.81	0.03	0.50
2	Greenville	9.576	1.00	0.93	0.50	1.00	0.38	0.50
3	Spartanburg	8.596	0.00	0.54	0.83	0.94	0.34	0.94
4	Berkeley	7.480	0.00	0.23	0.67	0.89	0.03	0.26
5	Horry	7.131	0.00	0.64	0.50	0.58	0.28	0.76
6	Anderson	6.713	0.00	0.32	0.67	0.64	0.25	0.47
7	Laurens	6.238	0.00	0.11	0.50	0.35	1.00	0.21
8	Beaufort	5.896	0.00	0.24	0.50	0.23	0.06	1.00
9	Colleton	5.395	0.00	0.07	0.33	0.35	0.00	0.06
10	Oconee	5.360	0.00	0.09	0.17	0.46	0.19	0.24
11	Pickens	5.351	0.00	0.16	0.17	0.35	0.25	0.18
12	Richland	5.074	0.00	0.86	0.33	0.66	0.03	0.29
13	Orangeburg	4.549	0.00	0.18	0.00	0.59	0.03	0.26
14	Dorchester	4.492	0.00	0.18	0.33	0.39	0.00	0.32
15	York	4.450	0.00	0.34	0.00	0.38	0.16	0.62
16	Cherokee	4.362	0.00	0.10	0.33	0.30	0.13	0.38
17	Chester	4.188	0.00	0.04	0.17	0.19	0.03	0.00
18	Georgetown	4.141	0.00	0.08	0.33	0.13	0.59	0.50
19	Lexington	3.840	0.00	0.48	0.33	0.77	0.00	0.21
20	Florence	3.771	0.00	0.32	0.17	0.42	0.19	0.47
21	Greenwood	3.682	0.00	0.11	0.00	0.29	0.06	0.29
22	Jasper	3.221	0.00	0.05	0.33	0.01	0.00	0.00
23	Abbeville	3.104	0.00	0.01	0.00	0.17	0.00	0.24
24	Aiken	3.073	0.00	0.25	0.17	0.53	0.00	0.32
25	Union	3.067	0.00	0.03	0.00	0.21	0.00	0.21
26	Williamsburg	2.502	0.00	0.04	0.00	0.17	0.09	0.09
27	Clarendon	2.452	0.00	0.04	0.00	0.35	0.00	0.18
28	Fairfield	2.370	0.00	0.02	0.00	0.11	0.00	0.00
29	Darlington	2.362	0.00	0.10	0.17	0.29	0.22	0.15
30	Kershaw	2.238	0.00	0.08	0.00	0.27	0.03	0.06
31	Barnwell	2.203	0.00	0.01	0.00	0.10	0.00	0.15
32	Hampton	2.152	0.00	0.01	0.00	0.04	0.00	0.06
33	Sumter	1.992	0.00	0.18	0.00	0.25	0.03	0.03
34	Chesterfield	1.833	0.00	0.04	0.00	0.16	0.00	0.09
35	Allendale	1.817	0.00	0.00	0.00	0.00	0.00	0.03
36	Newberry	1.685	0.00	0.05	0.17	0.21	0.00	0.03
37	Marlboro	1.665	0.00	0.03	0.00	0.11	0.03	0.15
38	Lancaster	1.476	0.00	0.09	0.33	0.16	0.00	0.24
39	Marion	1.343	0.00	0.03	0.00	0.19	0.00	0.18
40	Bamberg	1.254	0.00	0.00	0.00	0.10	0.00	0.06
41	Dillon	1.142	0.00	0.06	0.00	0.15	0.03	0.06
42	Calhoun	1.114	0.00	0.01	0.00	0.16	0.00	0.03
43	Lee	0.949	0.00	0.01	0.00	0.08	0.03	0.03
44	Saluda	0.721	0.00	0.01	0.17	0.12	0.00	0.00
45	McCormick	0.670	0.00	0.00	0.00	0.02	0.19	0.06
46	Edgefield	0.541	0.00	0.01	0.00	0.12	0.00	0.00

Appendix Table 2.2: Counties Ranked by All Hazards Scores (continued)

Rank	County	Total All-Hazards Score	Thunderstorm Wind	Tornado	Extreme Temperature	Wildfire	Winter Weather
1	Charleston	10.128	0.67	0.77	1.00	0.24	0.04
2	Greenville	9.576	0.98	0.36	0.90	0.07	1.00
3	Spartanburg	8.596	1.00	0.46	0.90	0.08	0.73
4	Berkeley	7.480	0.48	0.54	0.80	0.92	0.04
5	Horry	7.131	0.47	0.74	0.40	0.51	0.04
6	Anderson	6.713	0.80	0.49	0.90	0.05	0.52
7	Laurens	6.238	0.52	0.10	0.50	0.07	0.36
8	Beaufort	5.896	0.38	0.33	0.80	0.15	0.00
9	Colleton	5.395	0.64	0.28	0.80	0.64	0.04
10	Oconee	5.360	0.47	0.36	0.70	0.04	0.96
11	Pickens	5.351	0.49	0.36	0.40	0.09	0.92
12	Richland	5.074	0.72	0.67	0.10	0.18	0.07
13	Orangeburg	4.549	0.60	1.00	0.10	0.69	0.04
14	Dorchester	4.492	0.44	0.21	0.90	0.31	0.04
15	York	4.450	0.46	0.26	0.50	0.04	0.41
16	Cherokee	4.362	0.35	0.18	0.30	0.09	0.67
17	Chester	4.188	0.20	0.10	1.00	0.04	0.53
18	Georgetown	4.141	0.12	0.13	0.10	0.30	0.03
19	Lexington	3.840	0.87	0.36	0.00	0.63	0.08
20	Florence	3.771	0.35	0.59	0.10	0.60	0.11
21	Greenwood	3.682	0.35	0.15	0.50	0.12	0.29
22	Jasper	3.221	0.15	0.00	0.80	0.45	0.00
23	Abbeville	3.104	0.19	0.15	0.60	0.08	0.34
24	Aiken	3.073	0.56	0.62	0.10	0.48	0.04
25	Union	3.067	0.27	0.08	0.40	0.02	0.36
26	Williamsburg	2.502	0.07	0.13	0.00	1.00	0.07
27	Clarendon	2.452	0.22	0.44	0.10	0.49	0.05
28	Fairfield	2.370	0.20	0.31	0.10	0.12	0.15
29	Darlington	2.362	0.28	0.31	0.00	0.30	0.15
30	Kershaw	2.238	0.30	0.38	0.30	0.27	0.14
31	Barnwell	2.203	0.15	0.21	0.00	0.05	0.04
32	Hampton	2.152	0.21	0.13	0.60	0.19	0.01
33	Sumter	1.992	0.37	0.26	0.00	0.35	0.07
34	Chesterfield	1.833	0.16	0.36	0.00	0.35	0.18
35	Allendale	1.817	0.09	0.10	0.60	0.00	0.03
36	Newberry	1.685	0.25	0.56	0.00	0.02	0.15
37	Marlboro	1.665	0.15	0.15	0.00	0.16	0.19
38	Lancaster	1.476	0.16	0.03	0.00	0.05	0.19
39	Marion	1.343	0.14	0.00	0.00	0.05	0.08
40	Bamberg	1.254	0.15	0.23	0.00	0.06	0.04
41	Dillon	1.142	0.17	0.15	0.00	0.13	0.14
42	Calhoun	1.114	0.13	0.10	0.00	0.05	0.05
43	Lee	0.949	0.09	0.03	0.00	0.17	0.07
44	Saluda	0.721	0.13	0.05	0.00	0.01	0.08
45	McCormick	0.670	0.00	0.15	0.00	0.01	0.10
46	Edgefield	0.541	0.09	0.18	0.00	0.01	0.05

APPENDIX III – County Hazard Profiles

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STATE OF SOUTH CAROLINA

Appendix III - County Hazard Profiles

2008

South Carolina Emergency Management Division
Office of the Adjutant General

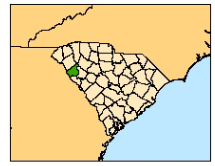
Update Prepared By the
Hazards Research and Vulnerability Institute
Department of Geography
University of South Carolina

December 2009

ABBEVILLE COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Abbeville County is vulnerable to both natural (hurricanes/tropical storms) and technological (hazardous material incidents) hazards. Winter weather produces the most monetary damage, and generally occurs every two years or so. Wildfires, thunderstorms, drought, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Abbeville County, most of the census tracts exhibit moderately elevated levels of social vulnerability. Figure 1 provides maps of the Abbeville County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

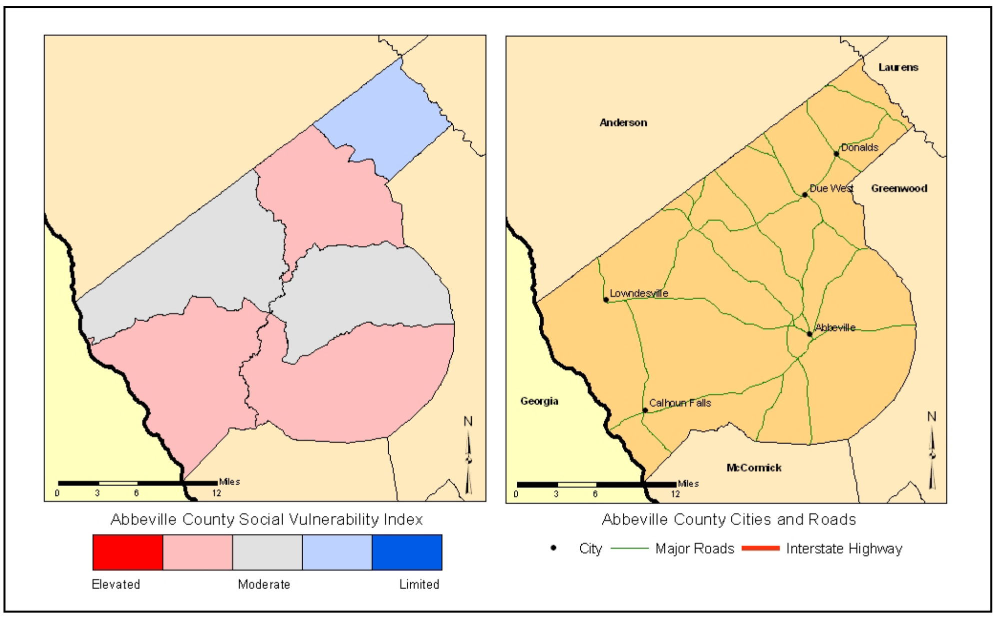


FIGURE 1. The Social Vulnerability for Abbeville County, SC by US Census tracts and a general reference map of Abbeville County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Abbeville County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Earthquakes and hurricane/tropical storms have the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Abbeville County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	2	158	79.00	1.27
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	33	59	1.79	55.93
Flood	14	59	4.21	23.73
Fog	3	12	4.00	25.00
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	12	310	25.83	3.87
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	22	22	1.00	100.00
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	2,979	10	<0.50	29,790.00**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	56	59	1.05	94.92
Heavy Precipitation	0	15	*	*
Lightning	8	16	2.00	50.00
Thunderstorm & Wind	108	59	0.54	183.05**
Tornado	14	59	4.21	23.73
Temperature Extremes	6	16	2.67	37.50
Wildfire	1,136	21	<0.50	5,409.52**
Winter Weather (Snow & Ice)	26	59	2.27	44.07

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Abbeville County has a higher probability of tornadoes and winter weather events, and just above the average for heat and drought. Figure 2 (page 3) shows those hazards occurring in the county that exceeded the state mean in red type. Severe weather (lightning , wind, thunderstorms, hail), and flooding are below the state mean indicating that these hazards historically have had less impact on Abbeville County than elsewhere in South Carolina.

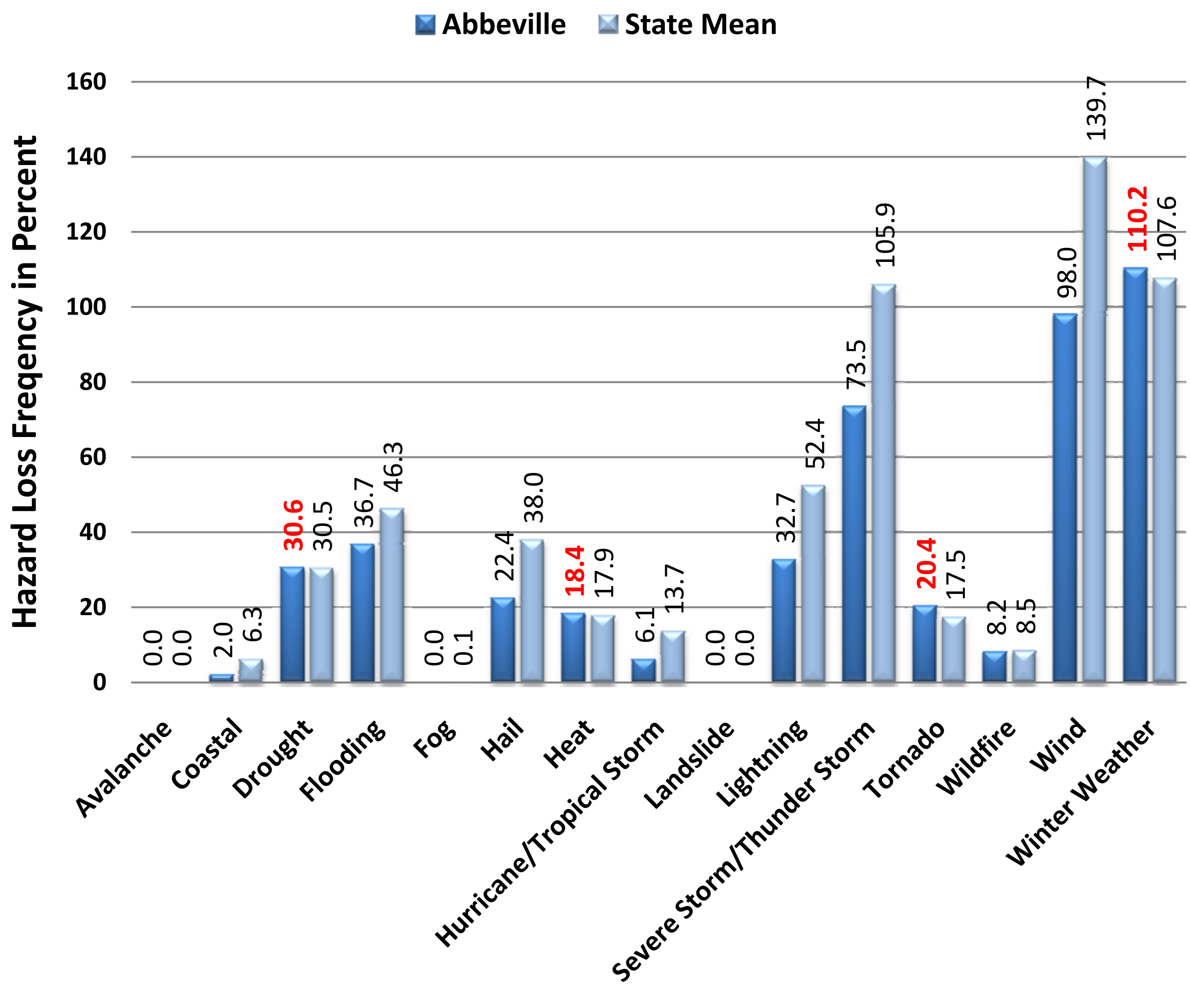


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Abbeville County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the total damage is calculated as the cumulative amount of damage from 1960 to 2008 based on twelve hazard types from the Hazards and Vulnerability Research Institute's SHELDUS database – available at (http://www.sheldus.org). The total losses for the county were $69 million or less than one percent of the state's total for the same time- period. The most significant cause of the losses was winter weather, contributing more than $31 million to the total.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.26%
Flooding	$3,085,076	2.07%
Hail	$404,288	0.41%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$329,868	0.01%
Lightning	$754,450	1.49%
Severe Storm/ Thunder Storm	$858,117	0.42%
Tornado	$4,440,494	1.95%
Wildfire	$334,042	2.18%
Wind	$2,597,620	1.85%
Winter Weather	$31,098,004	3.59%
Abbeville - Total	**$69,253,557**	**0.75%**

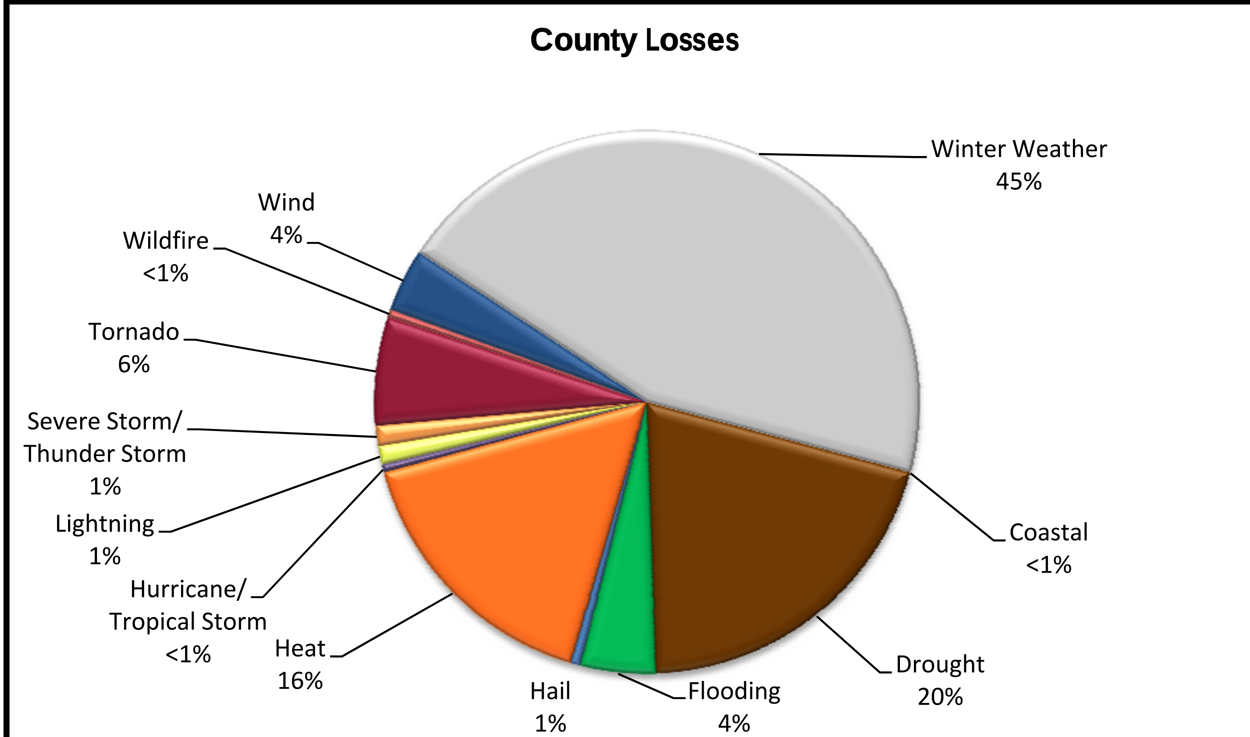
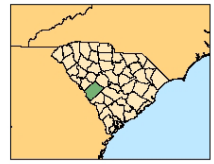


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Abbeville County, SC.

AIKEN COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Aiken County is vulnerable to both natural (hurricanes/tropical storms) and technological (hazardous material incidents) hazards. Drought and winter weather produce the greatest monetary damages; however, the recurrence interval for them is 59 and 15 years, respectively making them relatively rare events. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Aiken County, most of the census tracts exhibit moderate to low levels of social vulnerability. Census tracts in the city of Aiken show elevated SoVI scores. Figure 1 provides maps of the Aiken County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

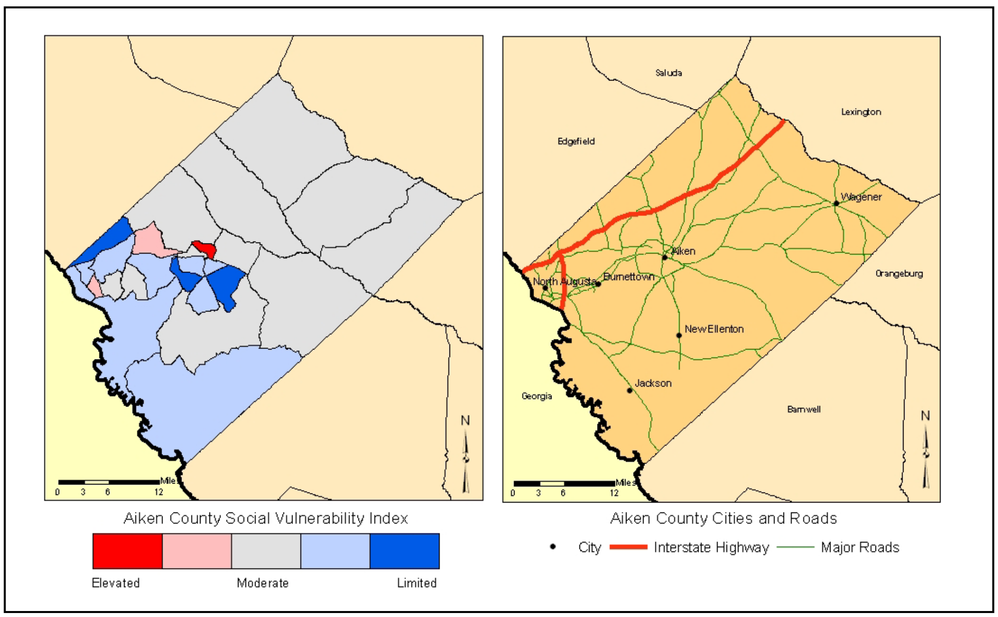


FIGURE 1. The Social Vulnerability for Aiken County, SC by US Census tracts and a general reference map of Aiken County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.

Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.

Hazard – the potential threat to humans as well as the impact of an event on society and the environment.

Recurrence – a calculated number that examines the expected time interval between events based on the historic record.

Risk – the likelihood or probability of occurrence of a hazard or adverse event.

Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Aiken County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Tropical storms/hurricanes, and earthquakes are hazards with the lowest recurrence intervals and have less than a ten percent chance of occurring in a given year given the historic record (Table 1).

TABLE 1. The Hazard Profile for Aiken County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	5	158	31.60	3.16
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59.00	1.69
Flood	6	59	9.83	10.17
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	6	310	51.67	1.94
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	178	22	<0.50	809.09**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	29,249	10	<0.50	292,490.00**
Severe Thunderstorm Events				
Funnel Cloud	1	16	16.00	6.25
Hail	123	59	<0.50	208.47**
Heavy Precipitation	0	15	*	*
Lightning	11	16	1.45	68.75
Thunderstorm & Wind	219	59	0.27	371.19**
Tornado	32	59	1.84	54.24
Temperature Extremes	1	16	16.00	6.25
Wildfire	3,426	21	<0.50	16,314.29**
Winter Weather (Snow & Ice)	4	59	14.75	6.78

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Aiken County has a higher probability of loss causing events from heat and lightning hazards. Figure 2 (page 3) shows those hazards occurring in the county that exceeded the state mean in red type. Winter weather and hurricanes are below the state mean indicating that these hazards historically have had less impact on Aiken County than elsewhere in South Carolina.

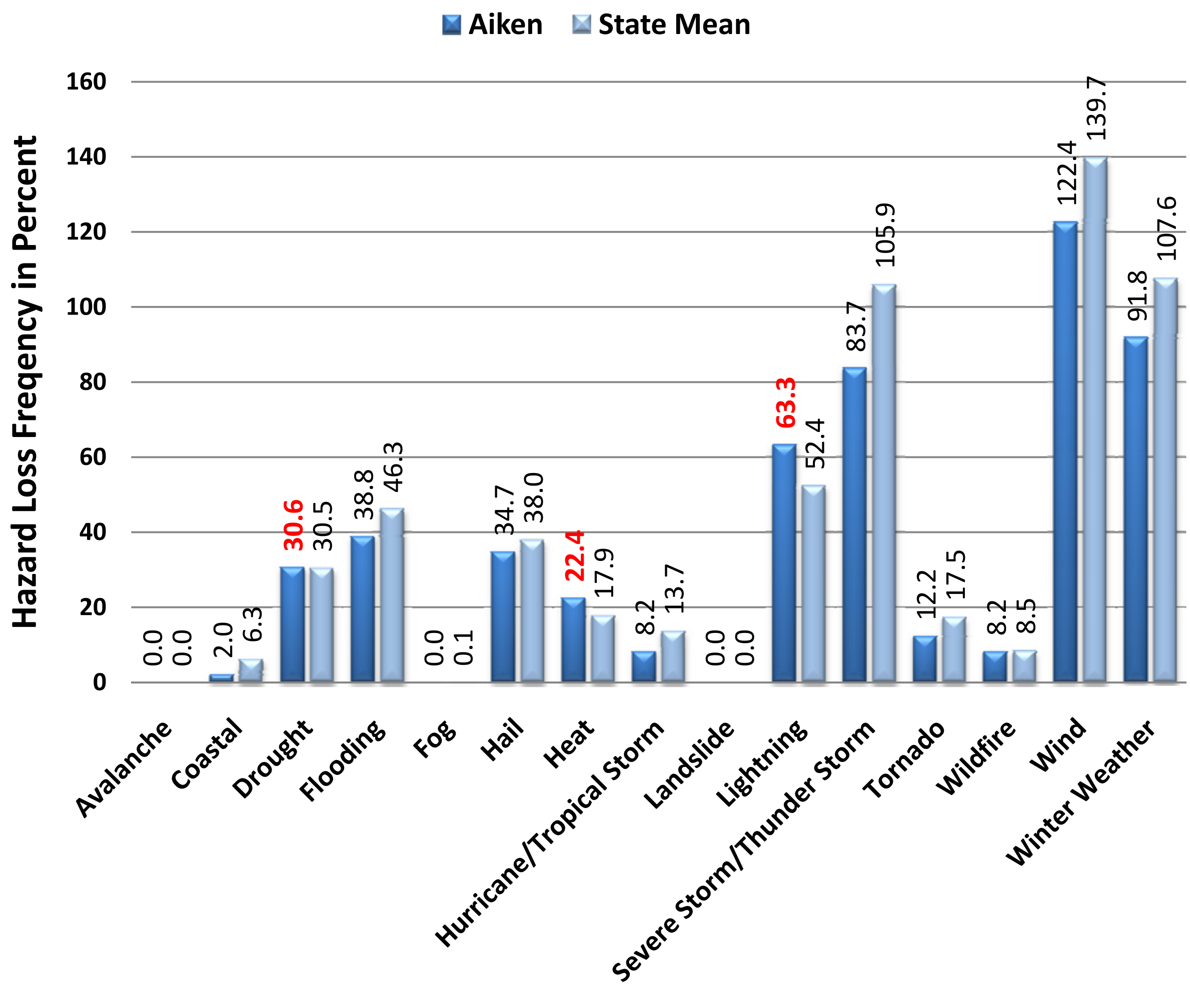


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Aiken County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the total damage is calculated as the cumulative amount of damage from 1960 to 2008 based on twelve hazard types from the Hazards and Vulnerability Research Institute's SHELDUS database – available at (http://www.sheldus.org). Winter weather, drought, and heat caused the largest amount of historic losses in Aiken County, representing more than 84% of the total losses, which were around $47 million. While significant for the county, this loss only accounted for less than one percent of the state's total damages related to natural hazards.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$572,522	0.37%
Hail	$412,862	0.40%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$335,570	0.01%
Lightning	$1,764,925	3.36%
Severe Storm/ Thunder Storm	$1,116,262	0.53%
Tornado	$2,065,663	0.87%
Wildfire	$334,042	2.09%
Wind	$1,046,932	0.72%
Winter Weather	$14,143,779	1.57%
Aiken - Total	**$47,144,155**	**0.52%**

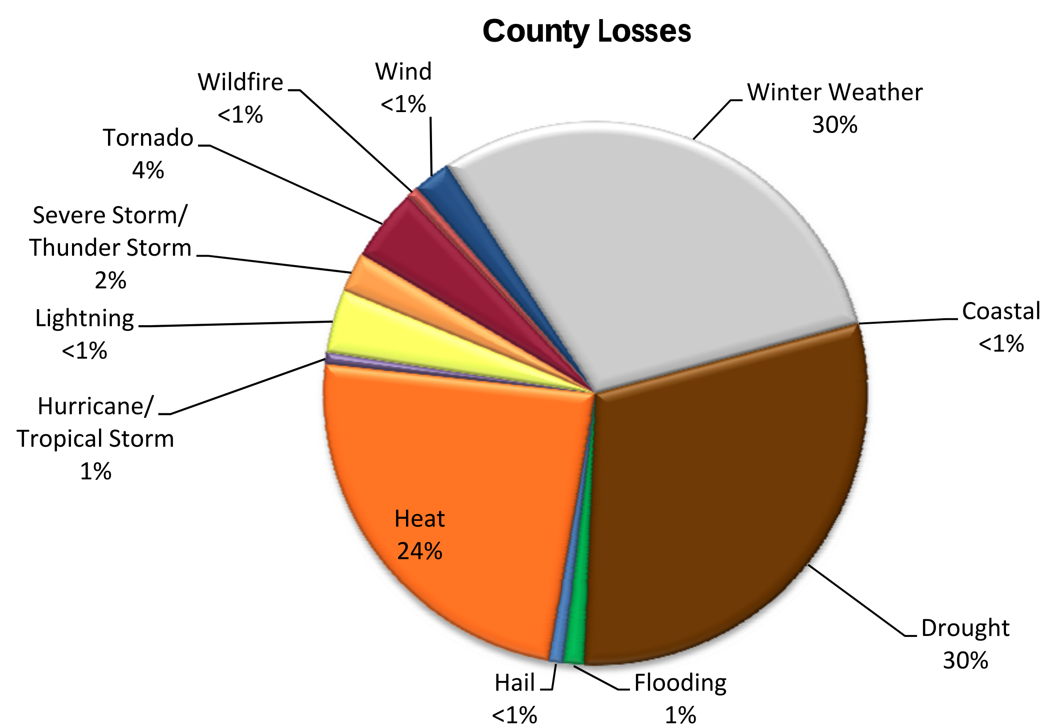
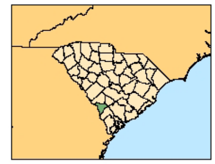


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Aiken County, SC.

ALLENDALE COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Allendale County is vulnerable to both natural (hurricanes/tropical storms) and technological (hazardous material incidents) hazards. Drought, heat, and winter weather produce the most monetary damages. Winter weather is a relatively rare event (occurring every 19 years or so), but it generates the most losses for the county. Some of the more frequent events that affect the county include temperature extremes, tornadoes, thunderstorms, and hazardous materials incidents.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Allendale County, most of the census tracts exhibit moderately high levels of social vulnerability. Figure 1 provides maps of the Allendale County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

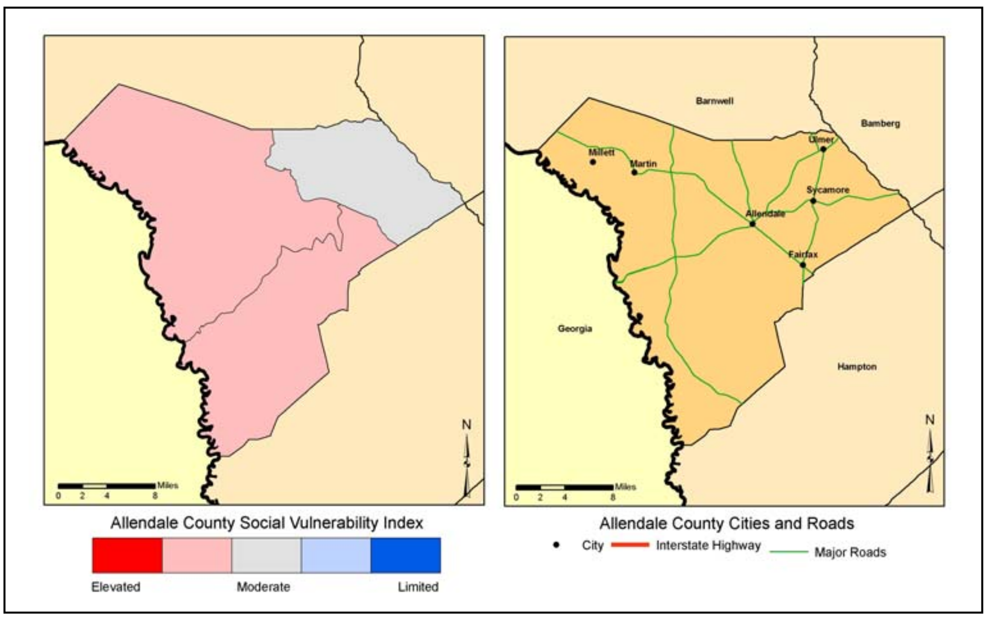


FIGURE 1. The Social Vulnerability for Allendale County, SC by US Census tracts and a general reference map of Allendale County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.

Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.

Hazard – the potential threat to humans as well as the impact of an event on society and the environment.

Recurrence – a calculated number that examines the expected time interval between events based on the historic record.

Risk – the likelihood or probability of occurrence of a hazard or adverse event.

Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Allendale County are transportation-related accidents, severe thunderstorms and wind, and wildfires. Flooding, hurricanes/tropical storms, winter weather, and lightning have less than a 10 percent chance of occurring in any given year given the historic record (Table 1).

TABLE 1. The Hazard Profile for Allendale County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	15	158	10.53	9.49
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	21	59	2.81	35.59
Flood	3	59	19.67	5.08
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	2	310	155.00	0.65
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	35	22	0.63	159.09
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	2,519	10	<0.50	25,190.00
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	25	59	2.36	42.37
Heavy Precipitation	0	15	*	*
Lightning	1	16	16.00	6.25
Thunderstorm & Wind	77	59	0.77	130.51
Tornado	12	59	4.92	20.34
Temperature Extremes	6	16	2.67	37.50
Wildfire	642	21	<0.50	3,057.14
Winter Weather (Snow & Ice)	3	59	19.67	5.08

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)

** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year

\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Allendale County has a slightly higher probability of loss producing thunderstorm and wind hazards. Figure 2 (page 3) shows those hazards occurring in the county that exceeded the state mean in red type. Heat and drought equal the state average. All other hazards are below the state mean indicating that these hazards historically have had less financial impact on Allendale County than elsewhere in South Carolina.

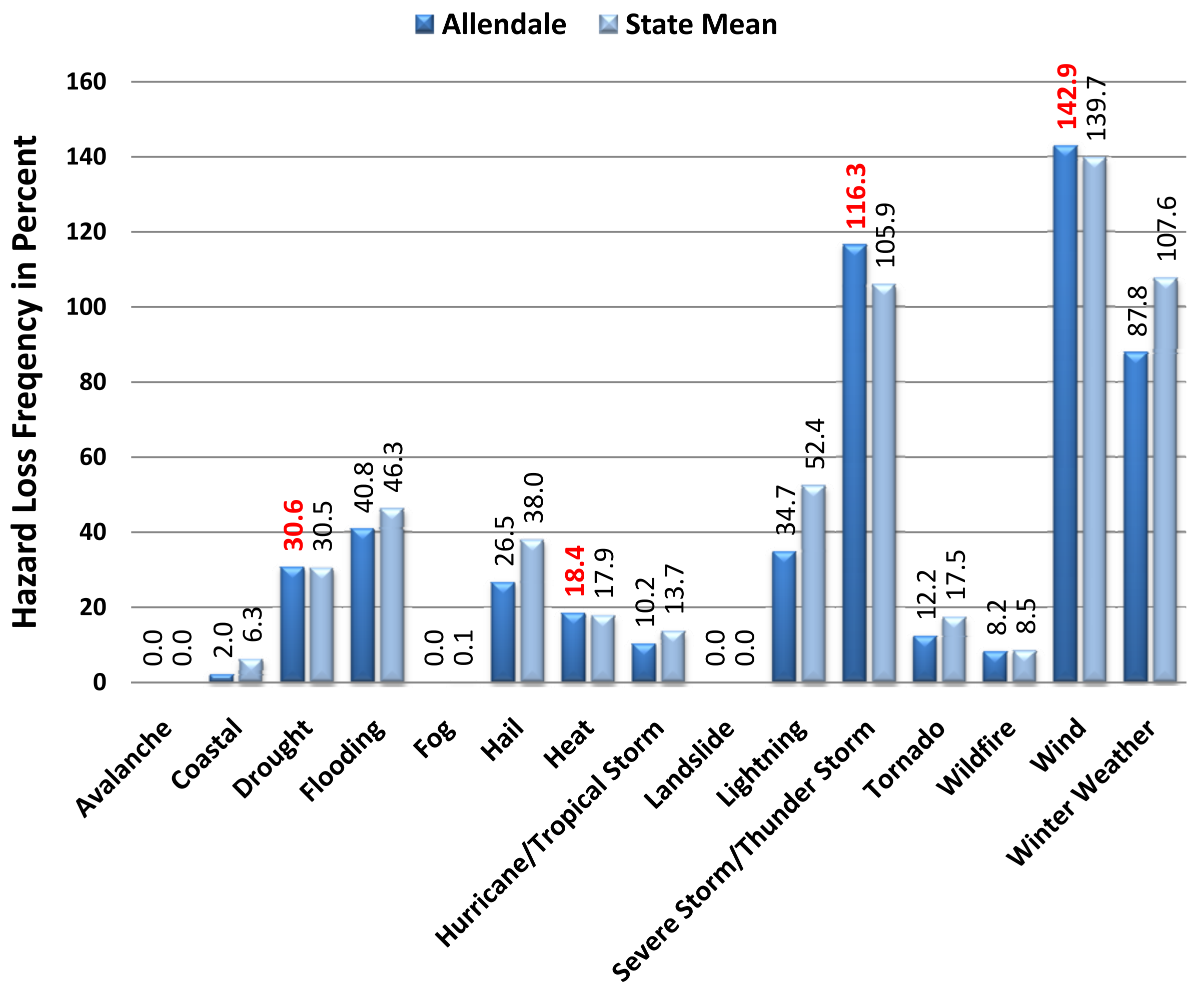


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Allendale County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the total damage is calculated as the cumulative amount of damage from 1960 to 2008 based on twelve hazard types from the Hazards and Vulnerability Research Institute's SHELDUS database – available at (http://www.sheldus.org). Winter weather, drought, and heat caused the largest amount of historic losses in Allendale County, losses that exceed $49 million. While significant for the county, the total losses only accounted for less than one percent of the state's total damages.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.26%
Flooding	$1,351,778	0.91%
Hail	$252,405	0.25%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$3,098,070	0.06%
Lightning	$798,003	1.58%
Severe Storm/ Thunder Storm	$942,941	0.46%
Tornado	$3,086,790	1.36%
Wildfire	$334,042	2.18%
Wind	$456,684	0.33%
Winter Weather	$14,145,628	1.63%
Allendale - Total	**$49,817,939**	**0.54%**

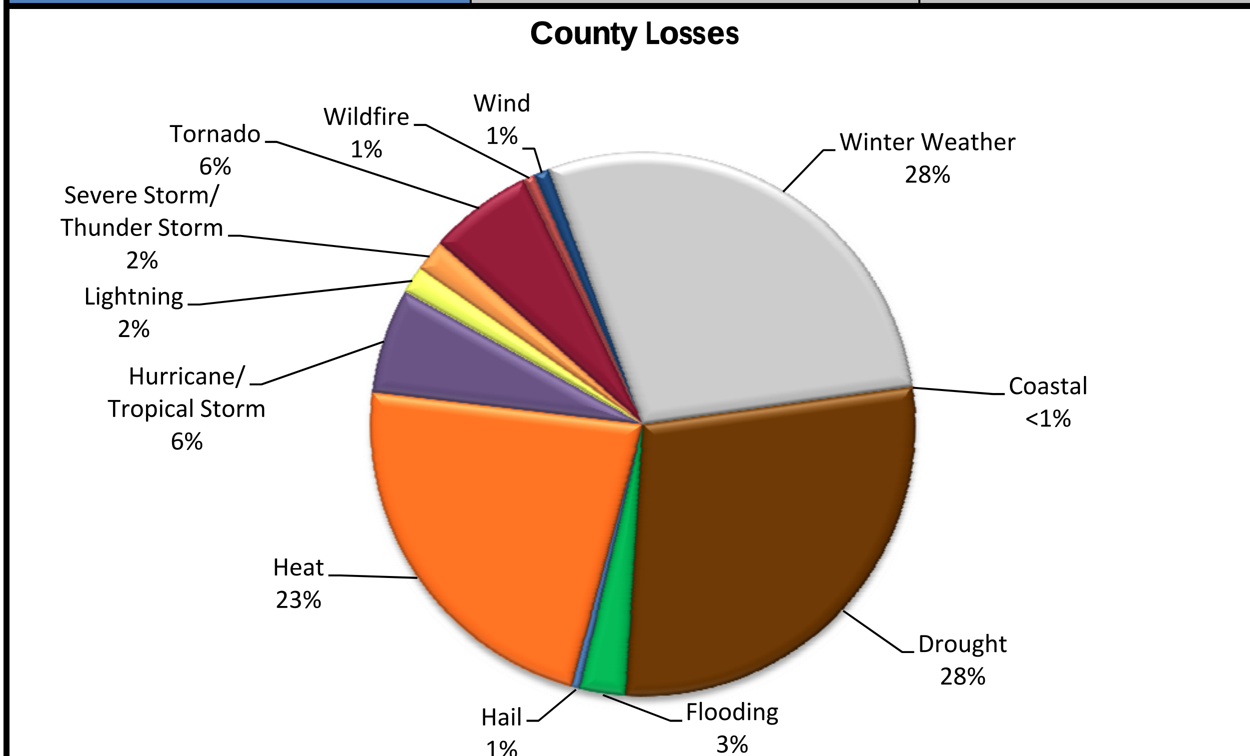
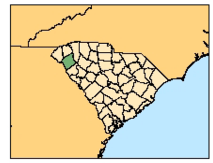


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Allendale County, SC.

ANDERSON COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Anderson County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Winter weather produces the greatest monetary damage; and with the high recurrence interval (1.5 years), this is a frequent loss-causing event. Wildfires, thunderstorms, lightning, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Anderson County, most of the census tracts exhibit moderate to limited levels of social vulnerability. Census tracts in the central part of the county (Anderson city and suburbs) show elevated SoVI scores. Figure 1 provides maps of the Anderson County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

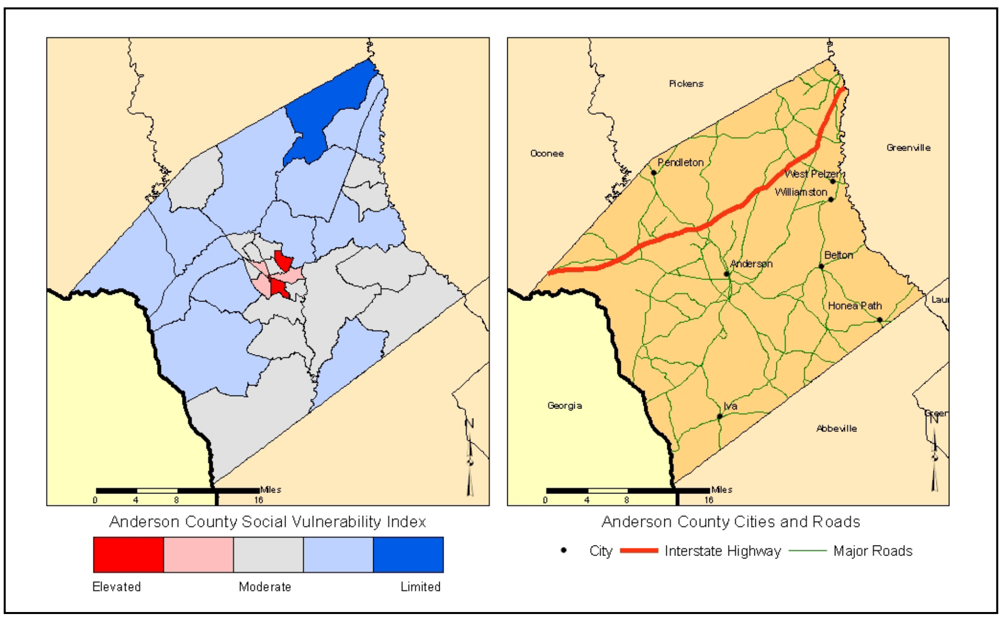


FIGURE 1. The Social Vulnerability for Anderson County, SC by US Census tracts and a general reference map of Anderson County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.

Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.

Hazard – the potential threat to humans as well as the impact of an event on society and the environment.

Recurrence – a calculated number that examines the expected time interval between events based on the historic record.

Risk – the likelihood or probability of occurrence of a hazard or adverse event.

Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Anderson County are hazardous material accidents, severe thunderstorms and wind, hail, and wildfires. Hurricanes/tropical storms are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Anderson County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	2	158	79.00	1.27
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	33	59	1.79	55.93
Flood	40	59	1.48	67.80
Fog	4	12	3.00	33.33
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	46	310	6.74	14.84
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	178	22	<0.50	809.09**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	36,317	10	<0.50	363,170.00**
Severe Thunderstorm Events				
Funnel Cloud	4	16	4.00	25.00
Hail	144	59	<0.50	244.07**
Heavy Precipitation	8	15	1.88	53.33
Lightning	16	16	1.00	100.00
Thunderstorm & Wind	294	59	<0.50	498.31**
Tornado	27	59	2.19	45.76
Temperature Extremes	9	16	1.78	56.25
Wildfire	955	21	<0.50	4,547.62**
Winter Weather (Snow & Ice)	39	59	1.51	66.10

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/

[b] includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)

** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year

\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Anderson County has a higher probability of loss-producing flooding, hail, heat, lightning, thunderstorm, tornado, wind, and winter weather events. It is slightly above the mean for drought. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Hurricane/tropical storms are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

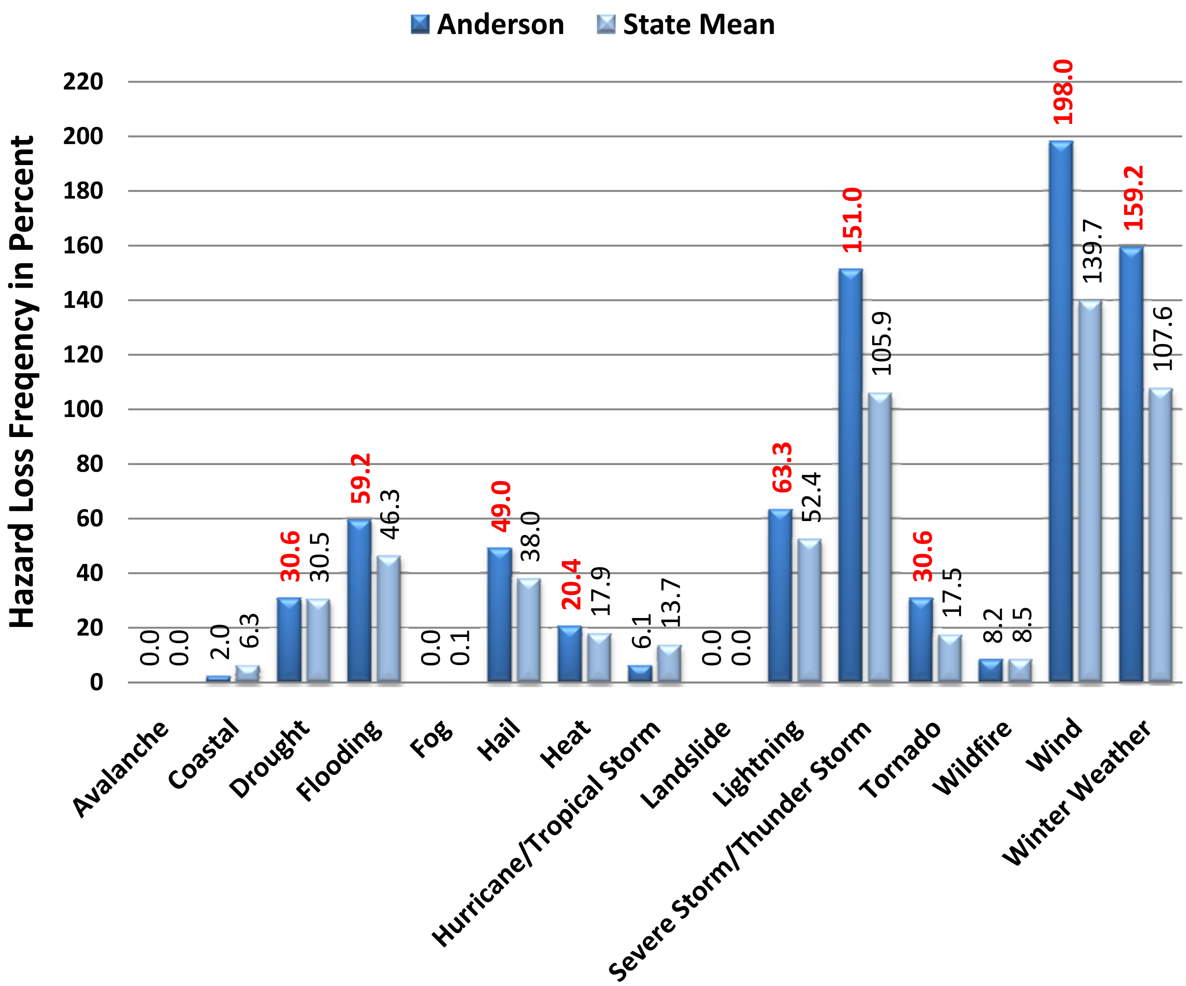


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Anderson County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Anderson County exceed $90 million, and are largely due to winter weather, followed by drought, heat, tornadoes, and lightning. While significant for the county, these cumulative losses represent about one percent of the state's total overall, but 16% of the state's total damages related to lightning.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.26%
Flooding	$2,719,332	1.83%
Hail	$1,736,459	1.75%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$329,868	0.01%
Lightning	$8,120,515	16.05%
Severe Storm/ Thunder Storm	$3,301,637	1.63%
Tornado	$10,281,298	4.51%
Wildfire	$334,042	2.18%
Wind	$6,613,437	4.71%
Winter Weather	$31,588,793	3.65%
Anderson - Total	**$90,376,979**	**0.98%**

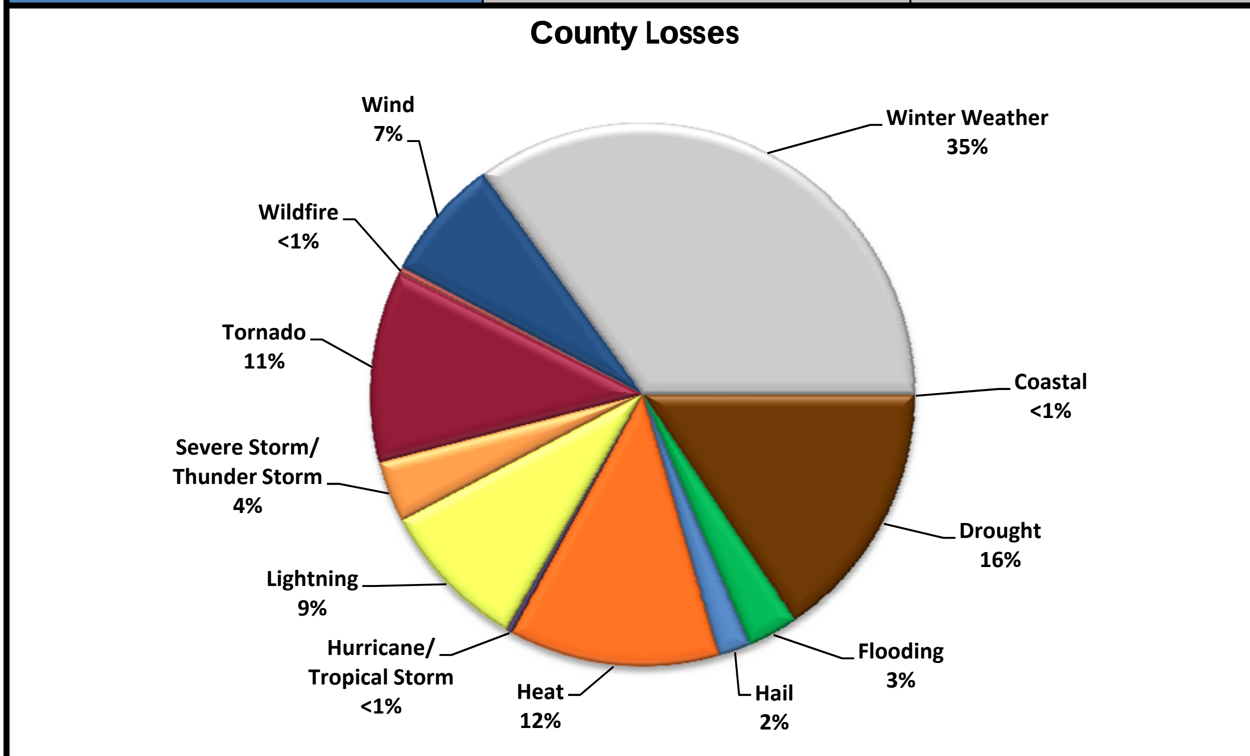
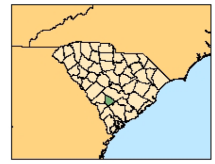


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Anderson County, SC.



BAMBERG COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008

I. Summary

Bamberg County is vulnerable to both natural (hurricanes/tropical storms) and technological (hazardous material incidents) hazards. Drought and winter weather produce the most monetary damages; however the recurrence interval is 15 years or more, making these relatively rare events. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

A majority of the census tracts in Bamberg County exhibit moderately elevated levels of social vulnerability. Figure 1 provides maps of the Bamberg County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

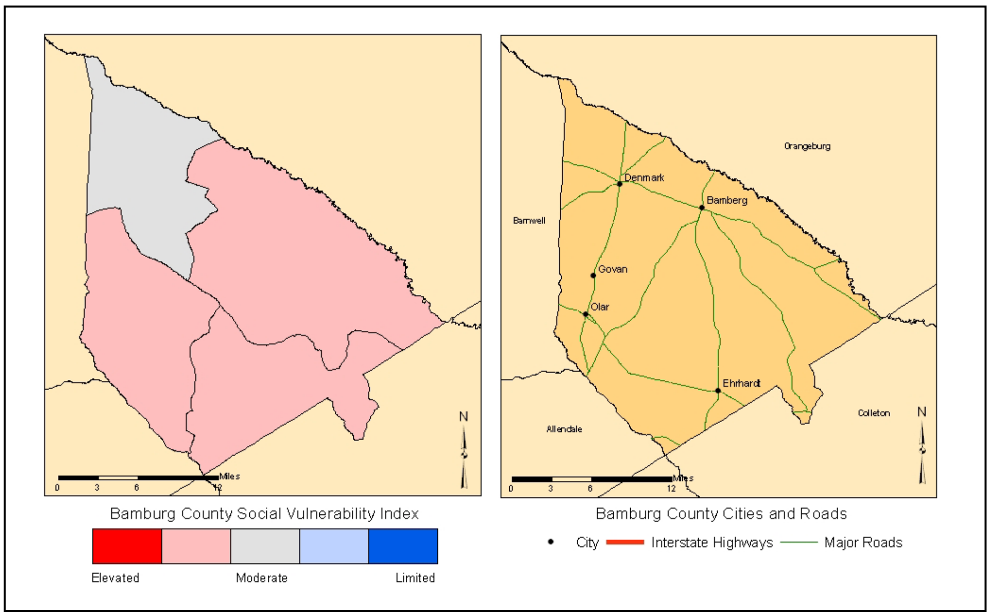


FIGURE 1. The Social Vulnerability for Bamberg County, SC by US Census tracts and a general reference map of Bamberg County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Bamberg County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Earthquakes and droughts have the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Bamberg County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	15	158	10.53	9.49
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59.00	1.69
Flood	7	59	8.43	11.86
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	3	310	103.33	0.97
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	28	22	0.79	127.27**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	2,144	10	<0.50	21,440.00**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	43	59	1.37	72.88
Heavy Precipitation	0	15	*	*
Lightning	2	16	8.00	12.50
Thunderstorm & Wind	97	59	0.61	164.41**
Tornado	17	59	3.47	28.81
Temperature Extremes	0	16	*	*
Wildfire	975	21	<0.50	4,642.86**
Winter Weather (Snow & Ice)	4	59	14.75	6.78

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Bamberg County generally has the same or less than the average number of loss-producing events from all hazards. Figure 2 (page 3) shows those hazards occurring in the county that exceeded the state mean in red type. Winter weather, wind, severe thunderstorms, tornadoes, lightning, and flooding are below the state mean indicating that these hazards historically have had less impact on Bamberg County than elsewhere in South Carolina.

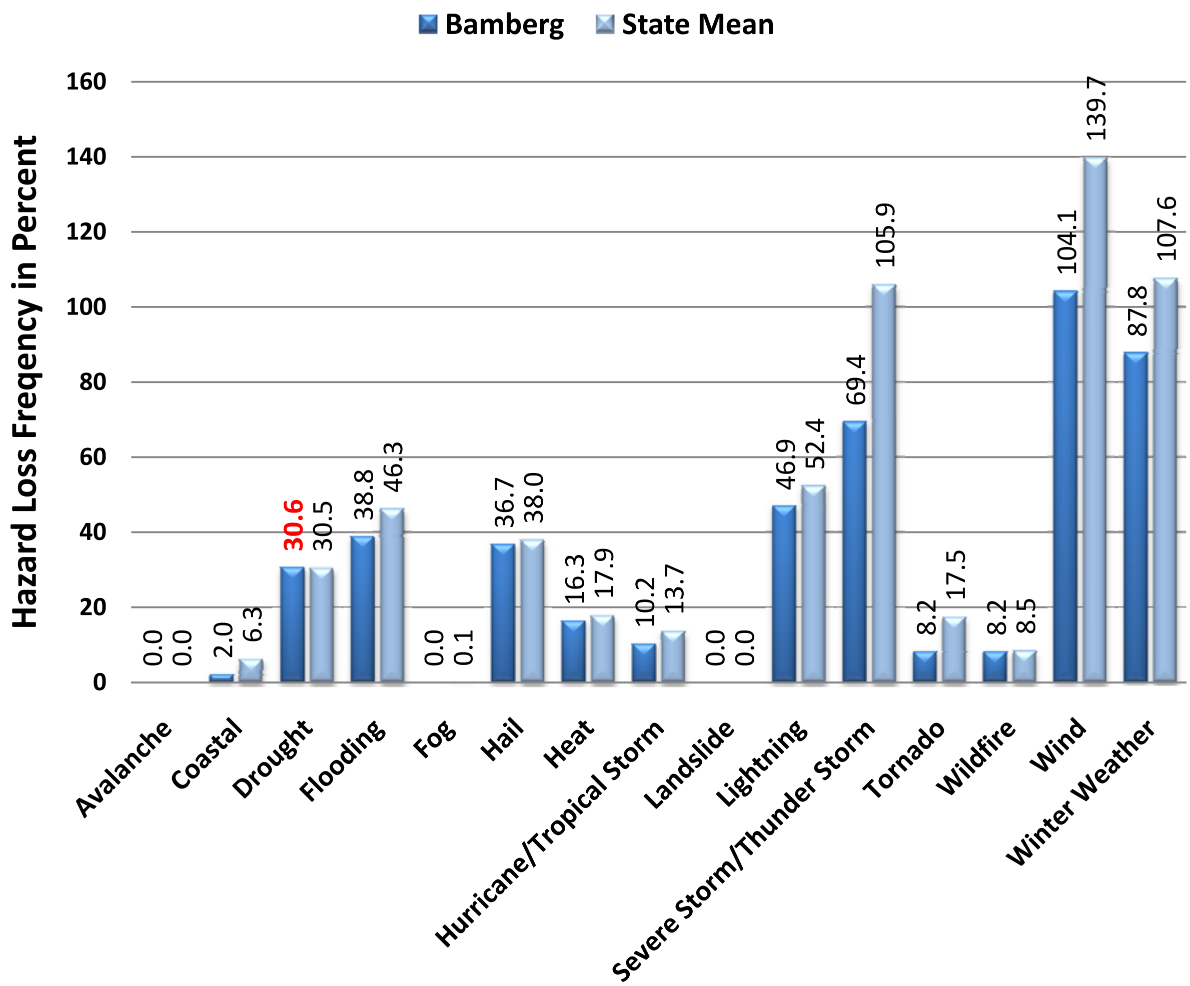


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Bamberg County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types from the Hazards and Vulnerability Research Institute's SHELDUS database – available at (http://www.sheldus.org). The historic losses in Bamberg County were around $46 million and largely due to winter weather, drought, and heat. While significant for the county, these losses represent less than one percent of the state's total during the same time period.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.26%
Flooding	$488,478	0.33%
Hail	$487,359	0.49%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$981,533	0.02%
Lightning	$1,140,805	2.26%
Severe Storm/ Thunder Storm	$1,143,792	0.56%
Tornado	$276,423	0.12%
Wildfire	$334,042	2.18%
Wind	$951,932	0.68%
Winter Weather	$14,542,313	1.68%
Bamberg - Total	**$45,698,275**	**0.50%**

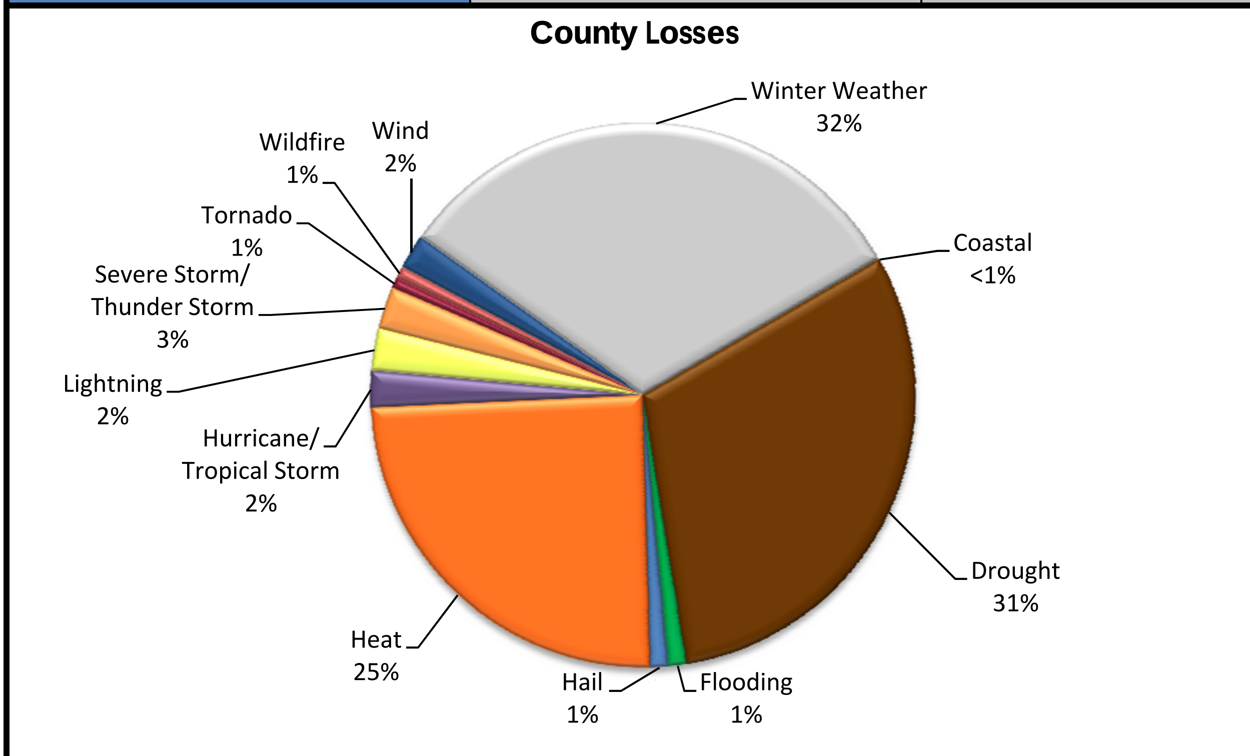
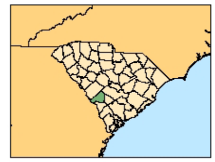


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Bamberg County, SC.

BARNWELL COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Barnwell County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents). Winter weather and drought produce the most monetary damages; however the recurrence interval is more than 14 years and 59 years respectively, making them relatively rare events. Wildfires, thunderstorms, and hazardous material incidents are more common and regularly affect the county on an annual basis.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Barnwell County, most of the census tracts exhibit a moderate level of social vulnerability, with one tract around Blackville in the moderately elevated category. Figure 1 provides maps of the Barnwell County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

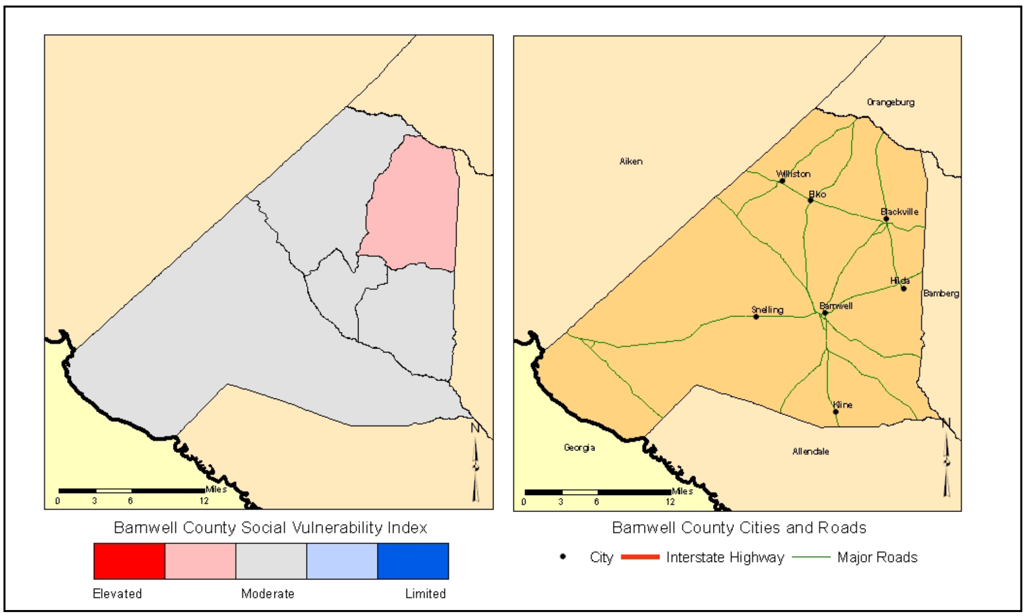


FIGURE 1. The Social Vulnerability for Barnwell County, SC by US Census tracts and a general reference map of Barnwell County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Barnwell County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Earthquakes, winter weather, and hurricanes are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Barnwell County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	12	158	13.17	7.59
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59.00	1.69
Flood	7	59	8.43	11.86
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	6	310	51.67	1.94
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	43	22	0.51	195.45**
Nuclear Power Plant	1	8	8.00	12.50
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	3,069	10	<0.50	30,690.00**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	44	59	1.34	74.58
Heavy Precipitation	0	15	*	*
Lightning	5	16	3.20	31.25
Thunderstorm & Wind	95	59	0.62	161.02**
Tornado	16	59	3.69	27.12
Temperature Extremes	0	16	*	*
Wildfire	955	21	<0.50	4,547.62**
Winter Weather (Snow & Ice)	4	59	14.70	6.78

[a] Data Sources: National Climatic Data Center (**www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm**); National Geophysical Data Center (**www.ngdc.noaa.gov/hazard/**

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)

** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year

\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Barnwell County has a slightly higher probability of drought, heat, and tornado hazards occurring than the statewide average. Figure 2 (page 3) shows those hazards occurring in the county that exceeded the state mean in red font, for which there are none. Winter weather, severe thunderstorms, and wind are well below the state mean indicating that these hazards have historically impacted the county less frequently when compared to the state as a whole.

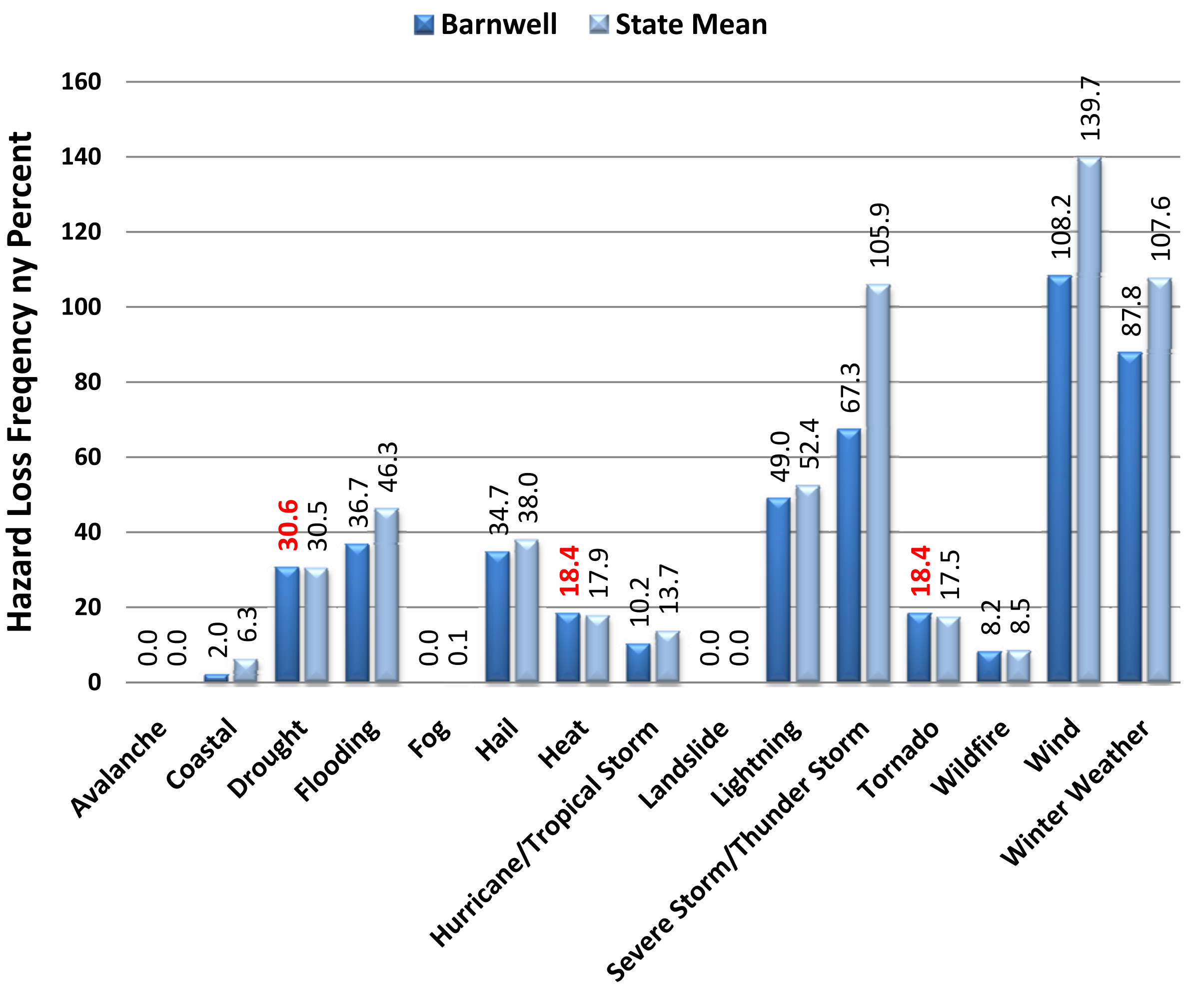


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Barnwell County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Barnwell County exceed $54 million and are largely due to winter weather, drought, and heat. While significant for the county, these cumulative losses represent less than one percent of the state's overall total.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.26%
Flooding	$556,147	0.37%
Hail	$480,526	0.48%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$5,338,101	0.10%
Lightning	$362,468	0.72%
Severe Storm/ Thunder Storm	$1,189,780	0.59%
Tornado	$5,302,642	2.33%
Wildfire	$334,042	2.18%
Wind	$1,382,700	0.99%
Winter Weather	$14,050,921	1.62%
Barnwell - Total	**$54,348,927**	**0.59%**

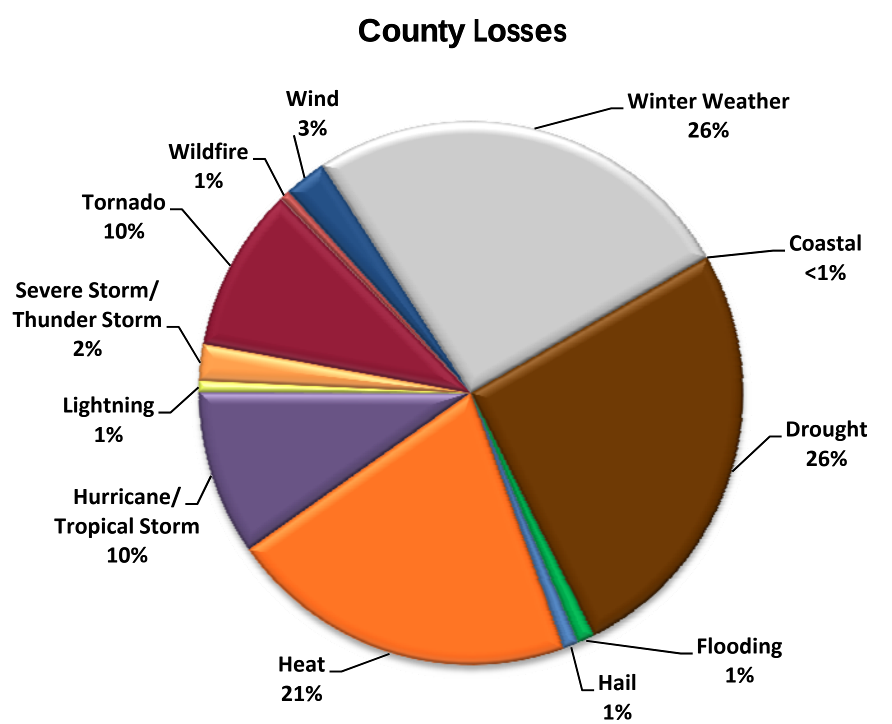
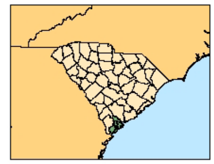


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Barnwell County, SC.

BEAUFORT COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Beaufort County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents). Winter weather produces the greatest monetary damage, but it occurs infrequently (on average once every 59 years. Hurricane/tropical storms and drought are more frequent than that, also producing significant monetary damages. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Beaufort County has a wide range of social vulnerability, with most tracts exhibiting moderate levels. However, Hilton Head Island shows the two extremes—with two tracts in the elevated category, many in the moderate category, and one tract in the limited category. Figure 1 provides maps of the Beaufort County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

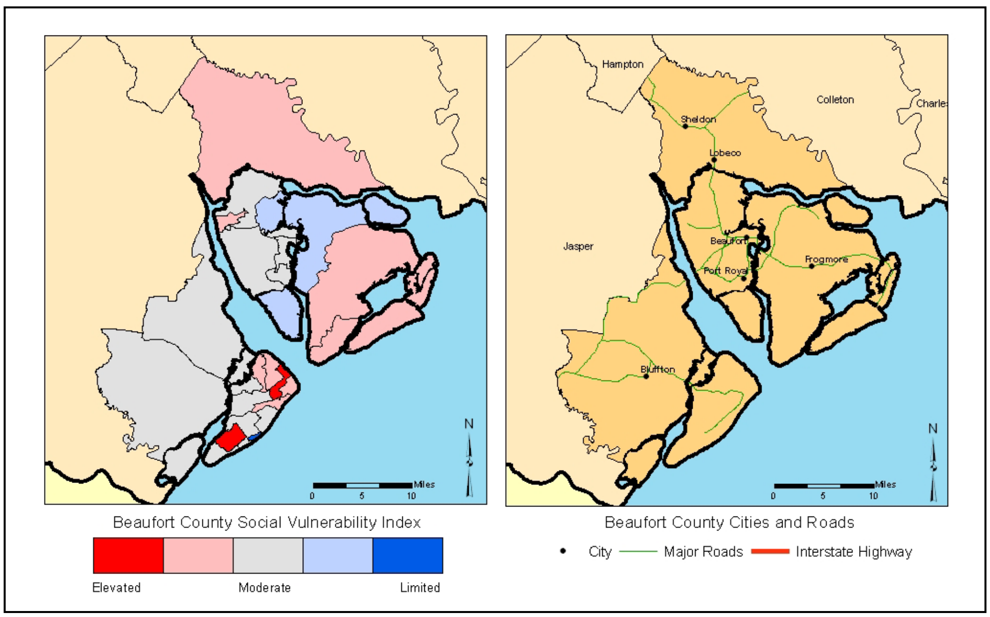


FIGURE 1. The Social Vulnerability for Beaufort County, SC by US Census tracts and a general reference map of Beaufort County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Beaufort County are hazardous material accidents, severe thunderstorms and wind, lightning, and wildfires. Earthquakes and winter weather are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Beaufort County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	20	158	7.90	12.66
Ocean & Lake Surf[b]	10	16	1.60	62.50
Waterspout	2	16	8.00	12.50
Dam Failure	-	-	-	-
Drought	21	59	2.81	35.59
Flood	25	59	2.36	42.37
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	1	310	310.00	0.32
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	435	22	<0.50	1,977.27**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	27,599	10	<0.50	275,990.00**
Severe Thunderstorm Events				
Funnel Cloud	3	16	5.33	18.75
Hail	67	59	0.88	113.56**
Heavy Precipitation	2	15	7.50	13.33
Lightning	34	16	<0.50	212.50**
Thunderstorm & Wind	167	59	<0.50	283.05**
Tornado	21	59	2.81	35.59
Temperature Extremes	8	16	2.00	50.00
Wildfire	1,508	21	<0.50	7,180.95**
Winter Weather (Snow & Ice)	1	59	59.00	1.69

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

VI. Hazard Loss Information

When compared to South Carolina as a whole, Beaufort County has a higher probability of coastal hazards, drought, flooding, heat, hurricanes, lightning, thunderstorms, tornado, and wind hazards. Figure 2 (page 3) shows those hazards occurring in the county that exceeded the state mean in red font. Winter weather is below the state mean indicating that this hazard historically produced fewer losses for the county than elsewhere in South Carolina.

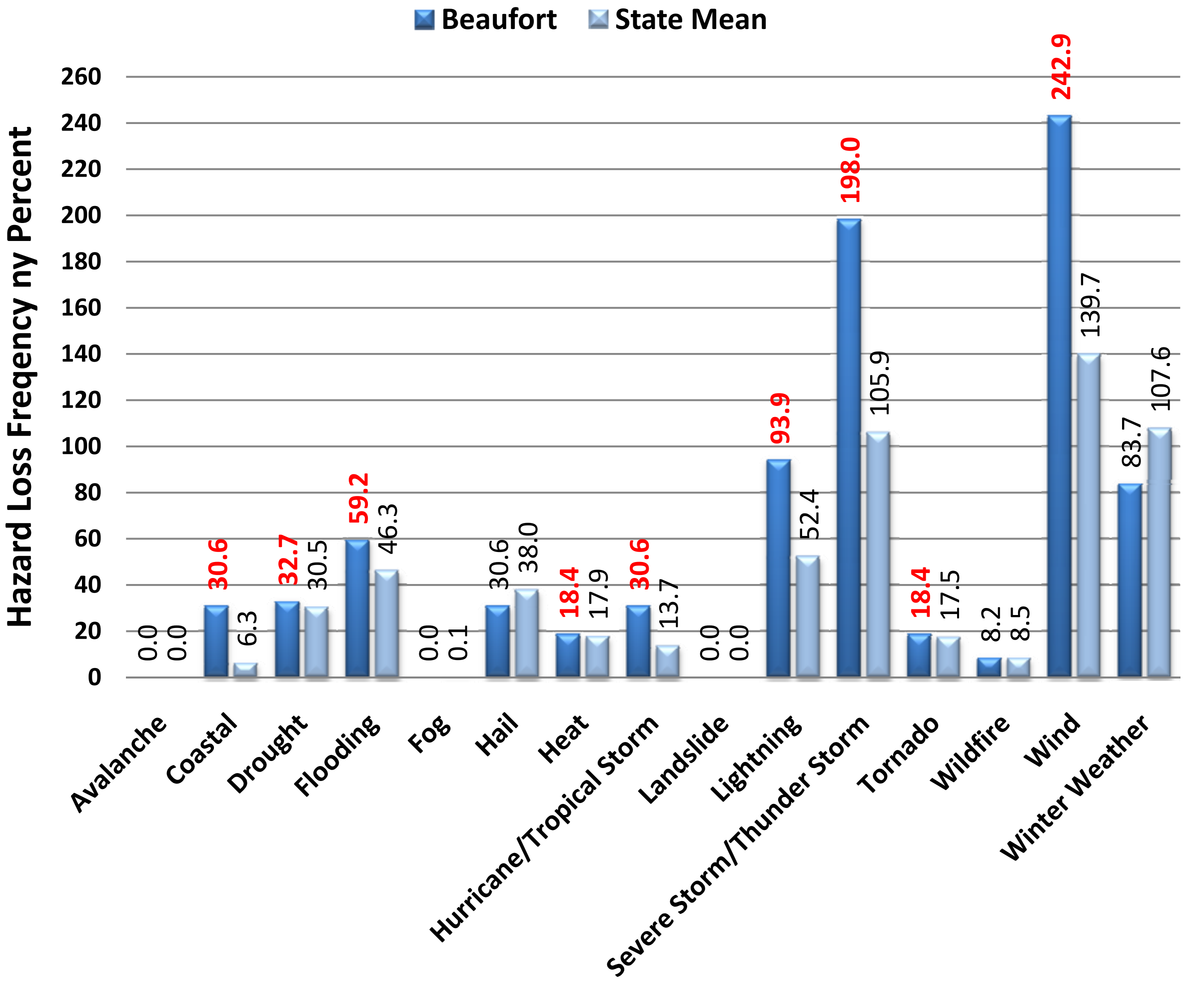


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Beaufort County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database – available at (http://www.sheldus.org). The historic losses in Beaufort County are around $86 million, due to a combination of winter weather, drought, hurricane/tropical storms, and flooding. Flooding losses represent 7% of the state's total. While significant for the county, these cumulative losses represent less than one percent of the state's total overall.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$10,417,191	1.01%
Drought	$14,201,478	2.28%
Flooding	$10,849,940	7.29%
Hail	$1,112,483	1.12%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$13,114,269	0.25%
Lightning	$2,864,863	5.66%
Severe Storm/ Thunder Storm	$1,467,873	0.72%
Tornado	$2,168,661	0.95%
Wildfire	$334,042	2.18%
Wind	$3,111,284	2.22%
Winter Weather	$14,226,954	1.64%
Beaufort - Total	**$85,155,682**	**0.93%**

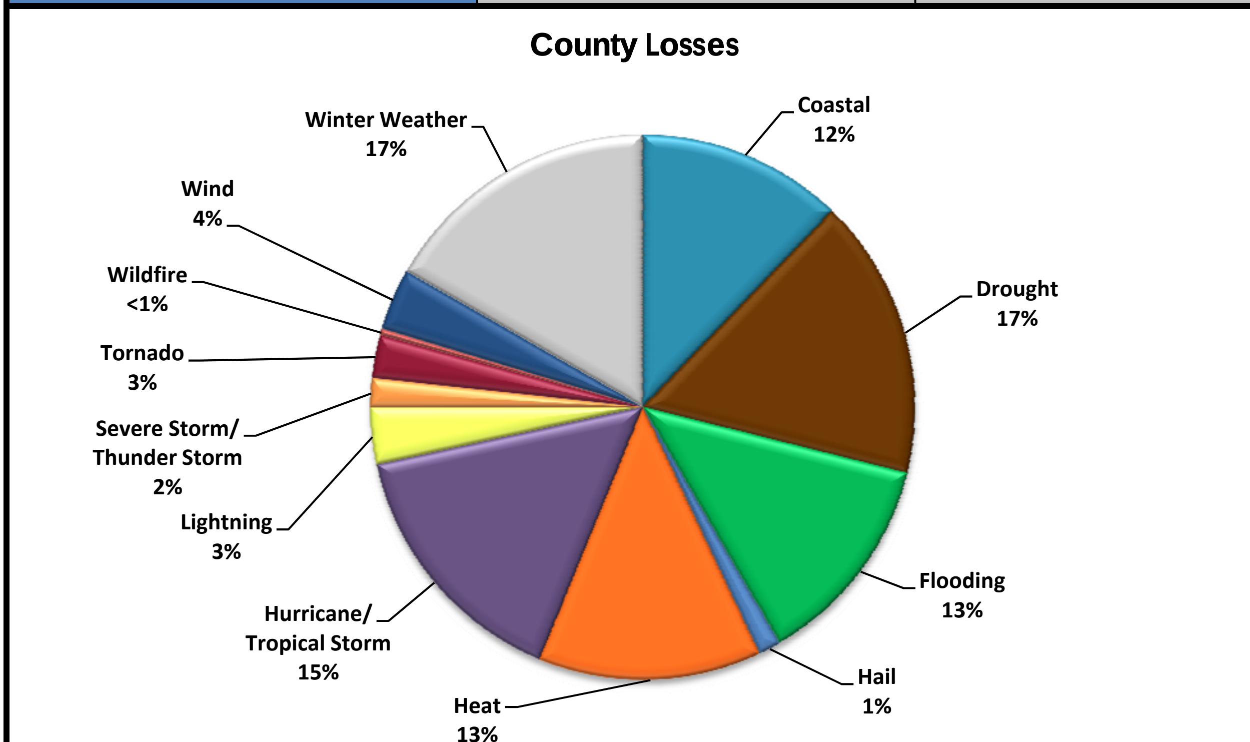
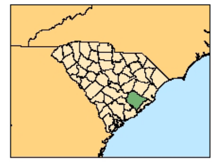


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Beaufort County, SC.

BERKELEY COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Berkeley County is vulnerable to both natural (hurricanes/tropical storms) and technological (hazardous material incidents) hazards. Hurricanes/tropical storms produce the highest monetary damages. The recurrence interval is 6.9 years, making them a somewhat regular event. Chronic hazards such as drought that have a shorter recurrence interval (3 years) should be carefully monitored. Wildfires, thunderstorms, hail and hazardous material incidents are some of the prominent hazards that annually affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Berkeley County, most of the census tracts exhibit moderate to limited levels of social vulnerability. Census tracts in the north eastern parts of the county have the highest SoVI scores. Figure 1 provides maps of the Berkeley County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

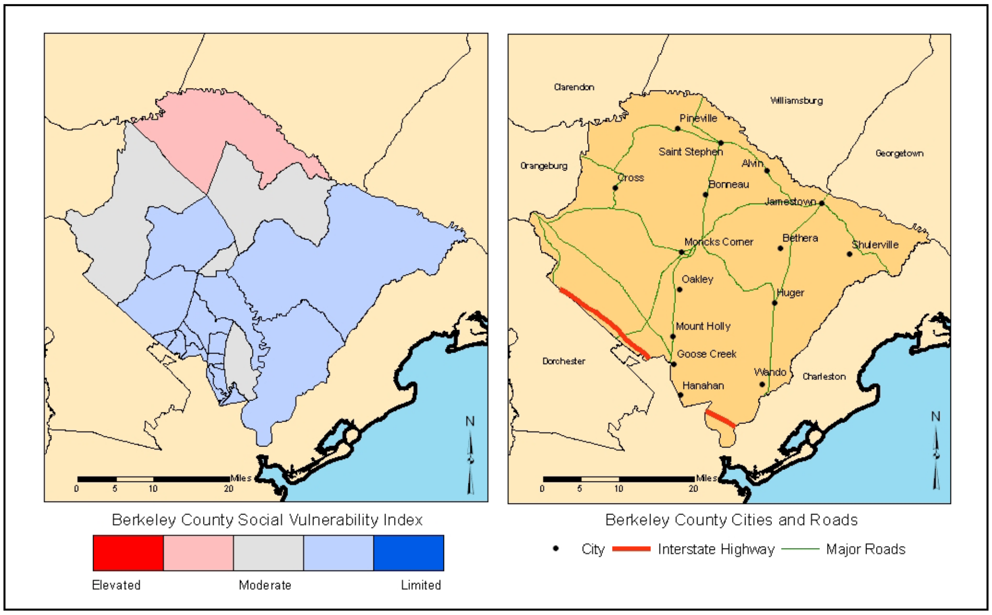


FIGURE 1. The Social Vulnerability for Berkeley County, SC by US Census tracts and a general reference map of Berkeley County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Berkeley County are hazardous material accidents, severe thunderstorms, wildfires, and earthquakes. Winter weather and ocean surf are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Berkeley County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	23	158	6.87	14.56
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	21	59	2.81	35.59
Flood	41	59	1.45	69.49
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	540	310	0.57	174.19**
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	440	22	<0.50	2000.00**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	27,051	10	<0.50	270,510.00**
Severe Thunderstorm Events				
Funnel Cloud	4	16	4.00	25.00
Hail	189	59	<0.50	320.34**
Heavy Precipitation	1	15	15.00	6.67
Lightning	9	16	1.78	56.25
Thunderstorm & Wind	196	59	<0.50	332.20**
Tornado	29	59	2.03	49.15
Temperature Extremes	8	16	2.00	50.00
Wildfire	6,014	21	<0.50	28,638.10**
Winter Weather (Snow & Ice)	4	59	14.75	6.78

[a] Data Sources: National Climatic Data Center (**www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm**); National Geophysical Data Center (**www.ngdc.noaa.gov/hazard/**
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Berkeley County has a higher probability of loss-producing coastal, drought, flood, heat, hurricanes/tropical storms, tornadoes, thunderstormws, and wind events. This comparison between the county and state seen in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Winter weather and lightning are both below the state mean indicating that these hazards have historically affected the county less frequently when compared to the state as a whole.

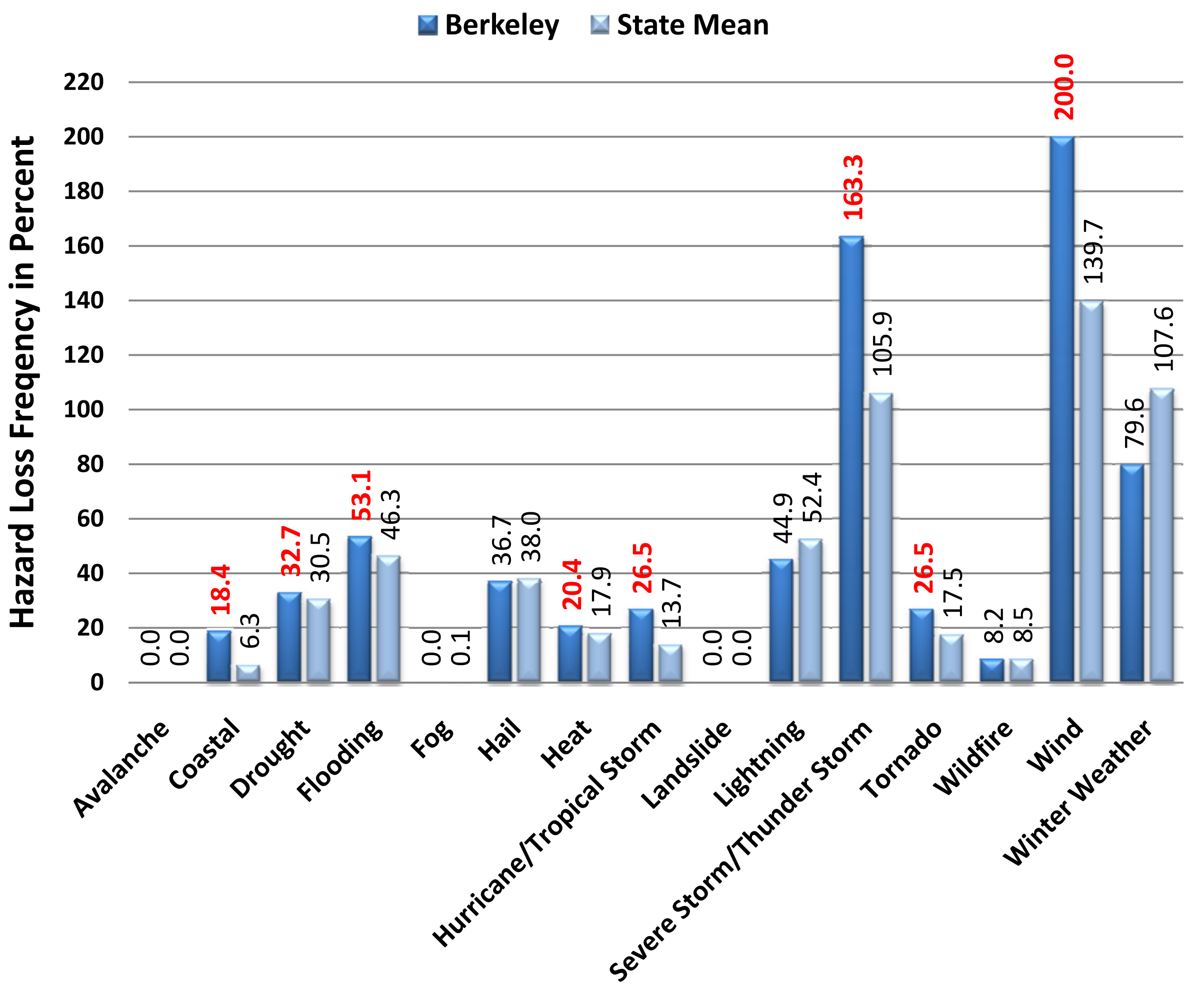


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Berkeley County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the total damage is calculated as the cumulative amount of damage from 1960 to 2008 based on twelve hazard types from the Hazards and Vulnerability Research Institute's SHELDUS database – available at (http://www.sheldus.org). Hurricane/tropical storms have caused the largest amount of historic losses in Berkeley County (94%), resulting in losses exceeding nearing $1billion. While significant for the county, hurricane loss represents 18% of the state's total losses from hurricanes (a significant portion of overall losses) indicating that hurricanes pose a major threat to lives and livelihoods for the state.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$693,847	0.07%
Drought	$14,201,478	2.28%
Flooding	$1,313,624	0.88%
Hail	$341,775	0.34%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$963,920,782	18.20%
Lightning	$609,401	1.20%
Severe Storm/ Thunder Storm	$1,395,304	0.69%
Tornado	$10,761,133	4.72%
Wildfire	$334,042	2.18%
Wind	$1,209,549	0.86%
Winter Weather	$15,342,112	1.77%
Berkeley - Total	**$1,021,409,692**	**11.10%**

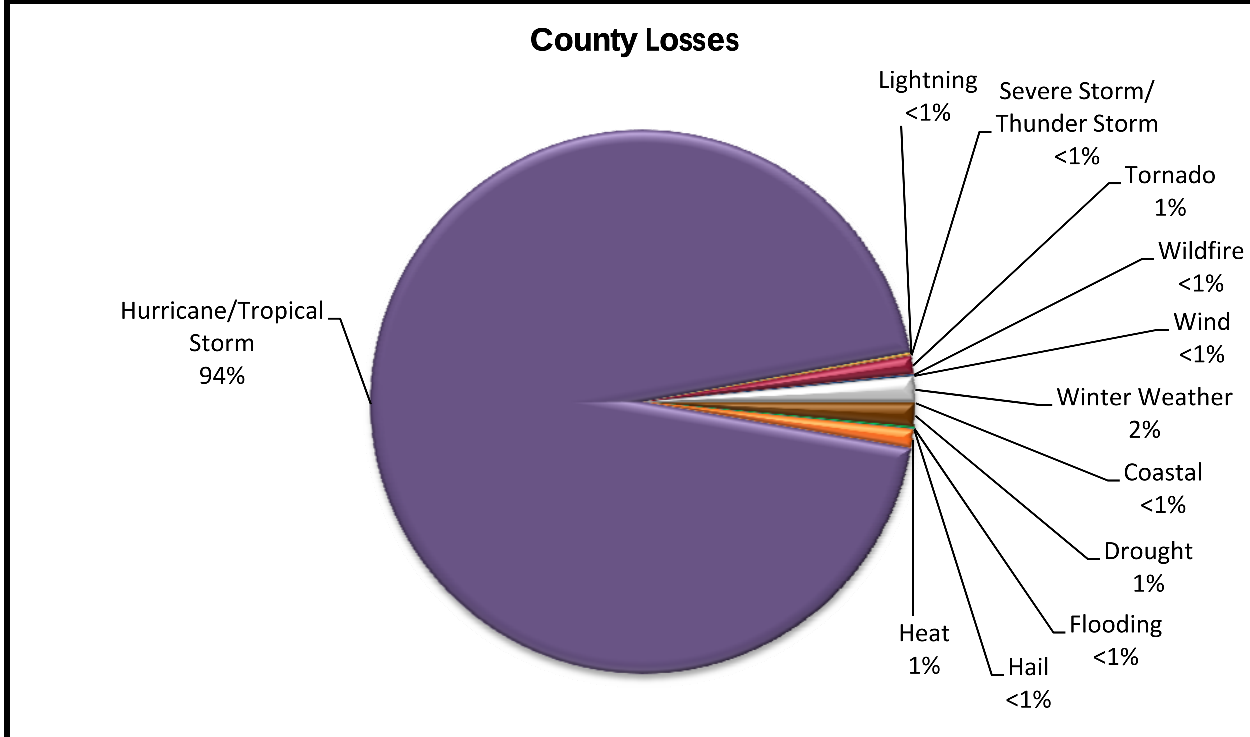
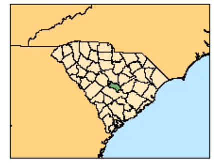


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Berkeley County, SC.

CALHOUN COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Calhoun County is vulnerable to both natural (hurricanes/tropical storms) and technological (hazardous material incidents) hazards. Hurricanes/tropical storms, winter weather, and drought produce the highest monetary damages; however, the recurrence interval is 10 years or more, making them relatively rare events. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Calhoun County, the tracts exhibit moderate to moderately elevated levels of social vulnerability in comparison to the remainder of the state. Figure 1 provides maps of Calhoun County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

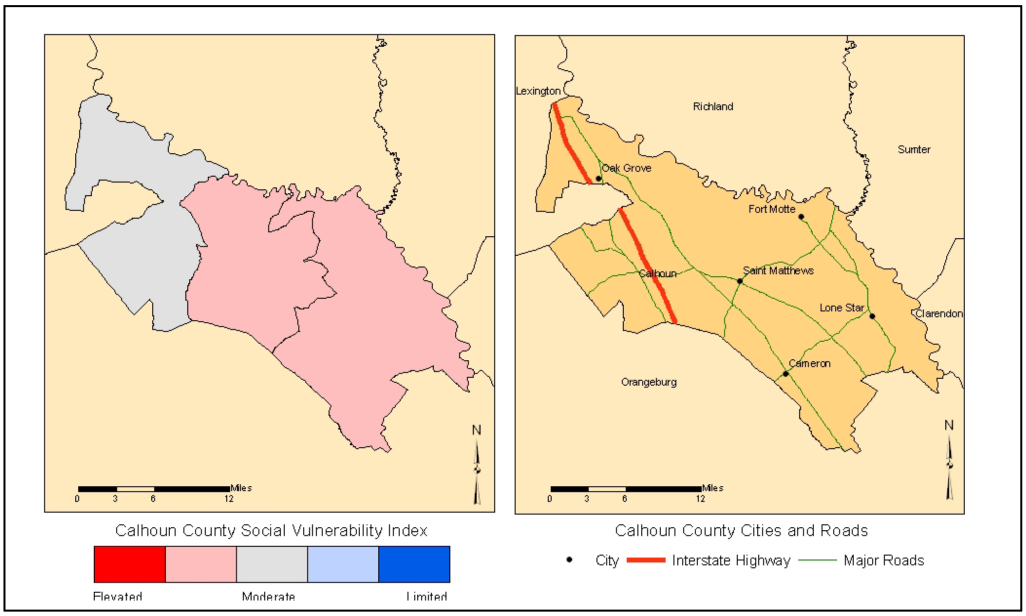


FIGURE 1. The Social Vulnerability for Calhoun County, SC by US Census tracts.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Calhoun County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Drought and earthquakes are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Calhoun County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	14	158	11.29	8.86
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59.00	1.69
Flood	6	59	9.83	10.17
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	2	310	155.00	0.65
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	81	22	<0.50	368.18**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	3,402	10	<0.50	34020**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	55	59	1.07	93.22
Heavy Precipitation	0	15	*	*
Lightning	1	16	16.00	6.25
Thunderstorm & Wind	91	59	0.66	154.24**
Tornado	12	59	4.92	20.34
Temperature Extremes	0	16	*	*
Wildfire	932	21	<0.50	4, 438.10**
Winter Weather (Snow & Ice)	5	59	11.80	8.47

[a] Data Sources: National Climatic Data Center (**www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm**); National Geophysical Data Center (**www.ngdc.noaa.gov/hazard/**

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)

** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year

\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Calhoun County has the state average or less than the state's average of loss-causing events. This comparison between the county and state can be seen in Figure 2 (page 3) with hazards that exceeded the state mean in red type. Winter weather, wind, and severe thunderstorms are well below the state mean indicating these hazards had less effect on the county when compared to the state as a whole.

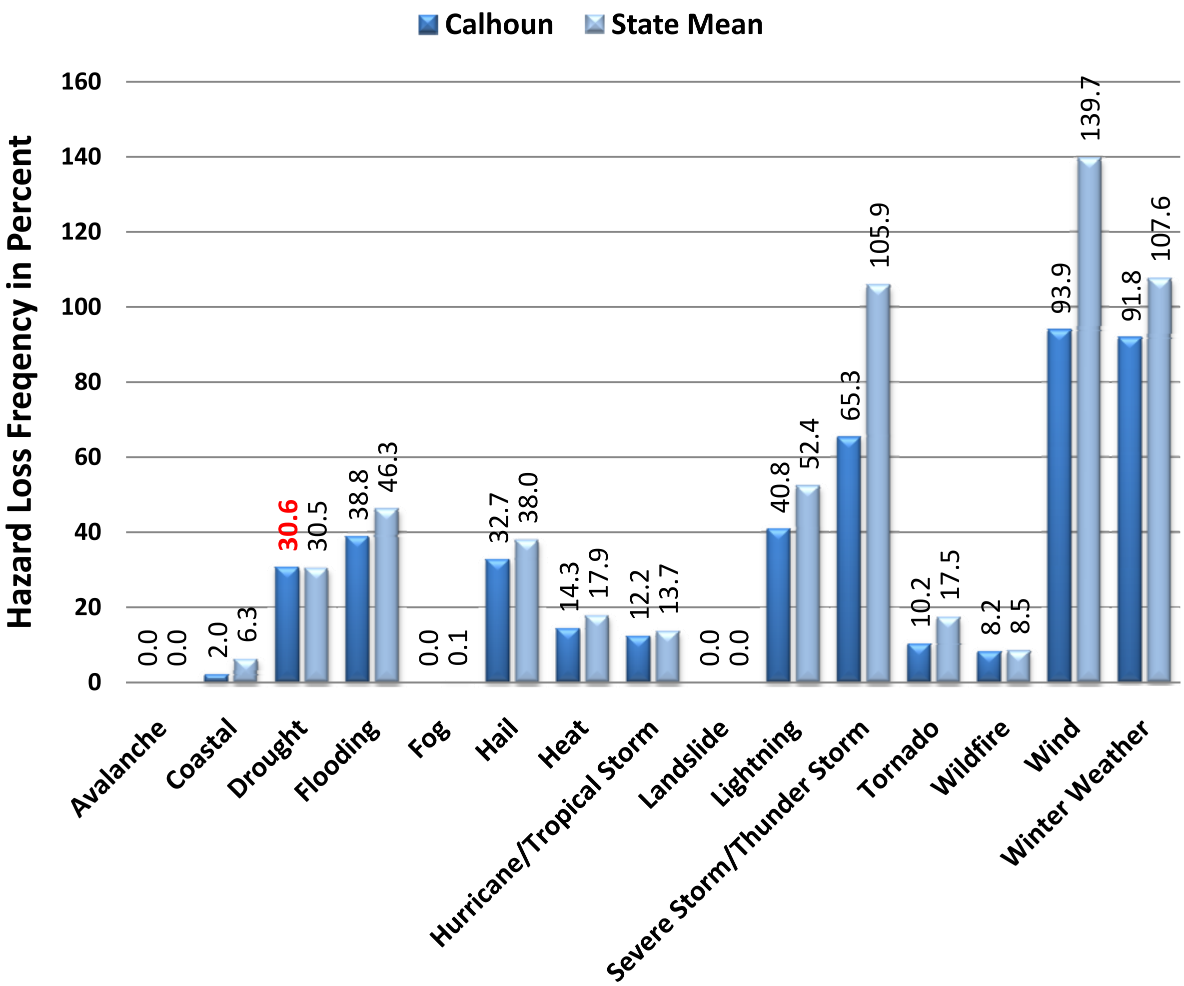


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Calhoun County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the total damage is calculated as the cumulative amount of damage from 1960 to 2008 based on twelve hazard types from the Hazards and Vulnerability Research Institute's SHELDUS database – available at (http://www.sheldus.org). The historic losses in Calhoun County exceed $63 million and are due to hurricanes, winter weather, and drought. Hurricanes/tropical storms represent 29% of the losses in Calhoun County historically. While significant for the county, these cumulative losses represent less than one percent of the state's overall total.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.26%
Flooding	$461,017	0.31%
Hail	$423,160	0.43%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$18,314,866	0.35%
Lightning	$257,071	0.51%
Severe Storm/ Thunder Storm	$1,623,665	0.80%
Tornado	$1,598,035	0.70%
Wildfire	$334,042	2.18%
Wind	$722,533	0.52%
Winter Weather	$14,594,454	1.68%
Calhoun - Total	**$63,680,442**	**0.69%**

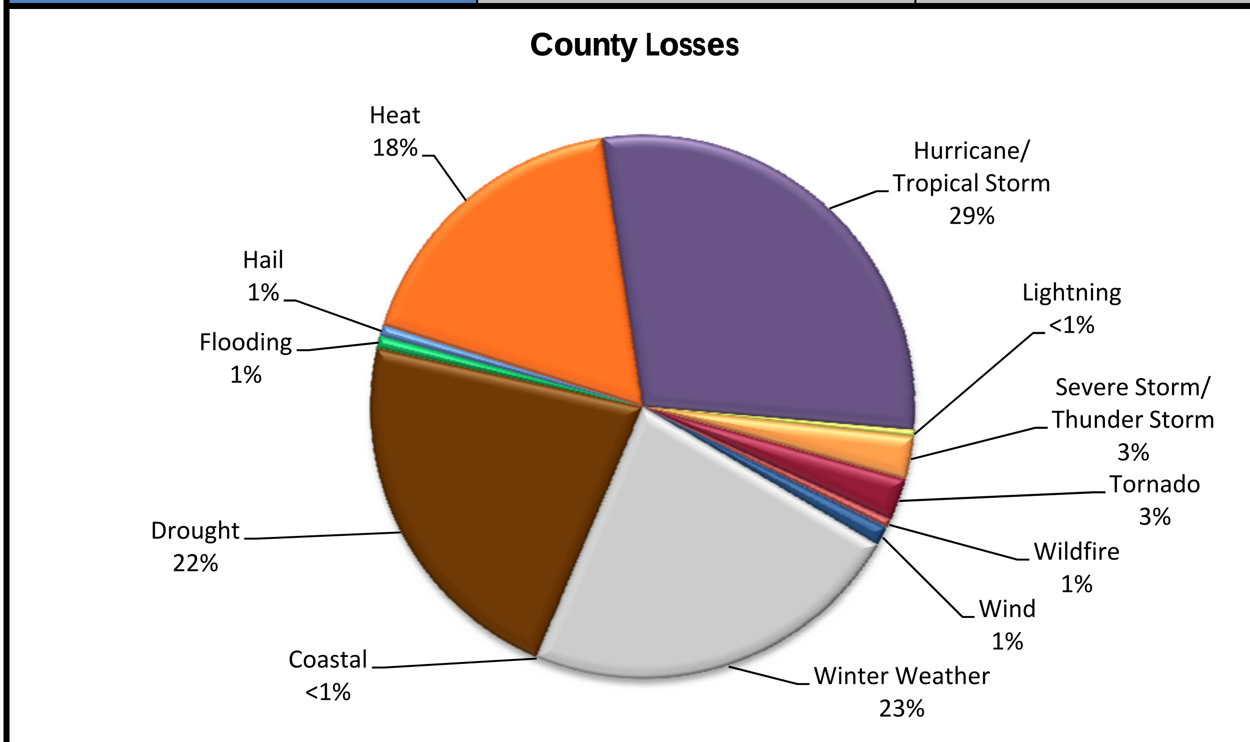
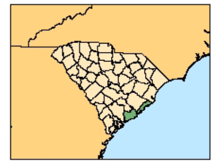


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Calhoun County, SC.

CHARLESTON COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Charleston County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Hurricane/tropical storms produce the greatest monetary damage; however, the recurrence interval is 7.9 years, making it a relatively infrequent event. Coastal hazards (ocean surf and erosion) are more frequent and contributed 46% of the losses for the county. Wildfires, thunderstorms, lightning, hail, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Charleston County, most of the census tracts exhibit moderate levels of social vulnerability. Census tracts in North Charleston and in Edisto Island have the highest SoVI scores, or elevated levels of social vulnerability. Figure 1 provides maps of the Charleston County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

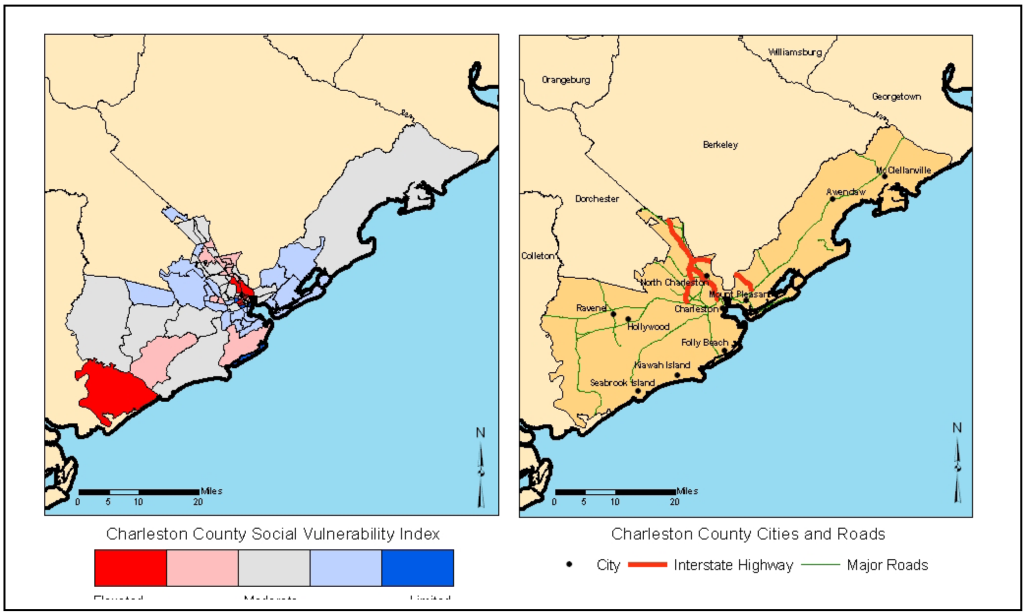


FIGURE 1. The Social Vulnerability for Charleston County, SC by US Census tracts.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Charleston County are hazardous material accidents, severe thunderstorms and wind, hail, lightning, and wildfires. Winter weather has the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Charleston County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	20	158	7.9	12.66
Ocean & Lake Surf[b]	13	16	1.23	81.25
Waterspout	17	16	0.94	106.25**
Dam Failure	-	-	-	-
Drought	20	59	2.95	33.90
Flood	77	59	0.77	130.51**
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	34	310	9.12	10.97
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	2685	22	<0.50	12,204.55**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	108,881	10	<0.50	108,8810.00**
Severe Thunderstorm Events				
Funnel Cloud	6	16	2.67	37.50
Hail	175	59	<0.50	296.61**
Heavy Precipitation	1	15	15.00	6.67
Lightning	17	16	0.94	106.25**
Thunderstorm & Wind	255	59	<0.50	432.20**
Tornado	38	59	1.55	64.41
Temperature Extremes	10	16	1.60	62.50
Wildfire	2,043	21	<0.50	9,728.57**
Winter Weather (Snow & Ice)	4	59	14.75	6.78

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Charleston County has a higher probability of loss-producing coastal, hurricane/tropical storm, drought, flooding, heat, lightning, thunderstorm, wind, and tornado events. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Winter weather is well below the state mean indicating that this hazard has historically produced fewer losses for the county when compared to the state as a whole.

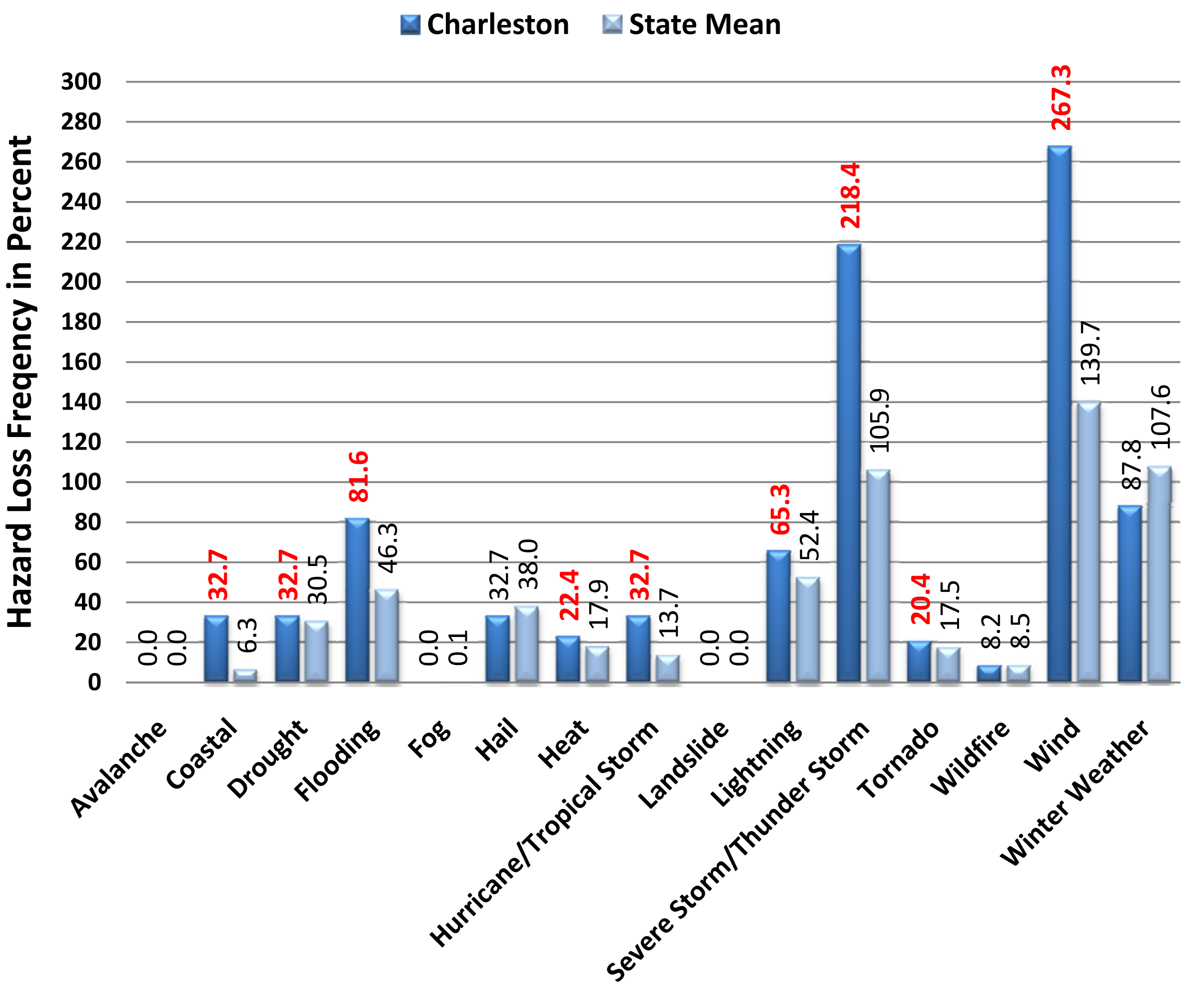


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Charleston County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Charleston County exceed $1.9 billion, and are largely due to hurricanes and tropical storms, followed by coastal. Hurricane/tropical storm represented 50% of the damage in Charleston County, while coastal represents another 46%. While significant for the county, these cumulative losses represent 21% of the state's total overall, but 18% of the state's total damages related to hurricane/tropical storms, and 84% of the state's losses due to coastal hazards.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$872,926,747	84.62%
Drought	$14,201,478	2.28%
Flooding	$8,914,096	5.99%
Hail	$1,820,459	1.83%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$964,098,174	18.20%
Lightning	$2,353,700	4.65%
Severe Storm/ Thunder Storm	$3,071,684	1.51%
Tornado	$5,720,430	2.51%
Wildfire	$334,042	2.18%
Wind	$14,844,294	10.58%
Winter Weather	$14,120,915	1.63%
Charleston - Total	**$1,913,692,663**	**20.80%**

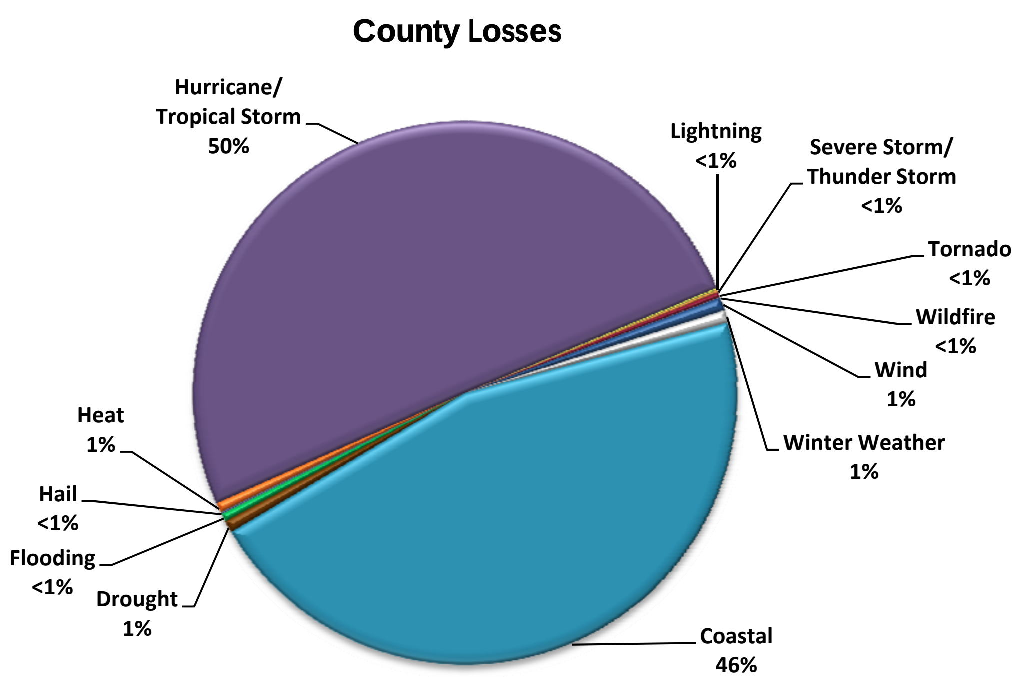
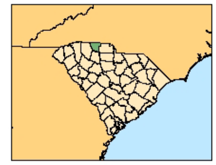


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Charleston County, SC.

CHEROKEE COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Cherokee County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Winter weather produces the greatest monetary damage; and the recurrence interval is 1.2 years, making it a frequent loss-producing hazard. Wildfires, thunderstorms, hail, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Cherokee County, most of the census tracts exhibit moderate levels of social vulnerability. The exception is the census tract near Gaffney, which shows an elevated level of social vulnerability based on the high SoVI score. Figure 1 provides maps of the Cherokee County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

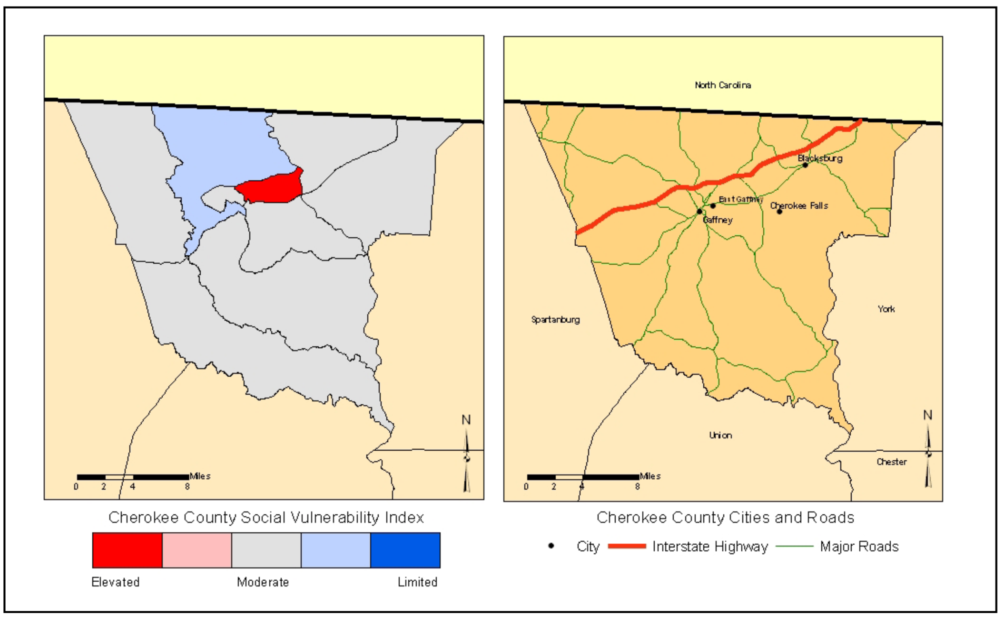


FIGURE 1. The Social Vulnerability for Cherokee County, SC by US Census tracts and a general reference map of Cherokee County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Cherokee County are hazardous material accidents, severe thunderstorms and wind, hail, and wildfires. Hurricane/tropical storms are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Cherokee County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	4	158	39.50	2.53
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure		-	-	-
Drought	33	59	1.79	55.93
Flood	17	59	3.47	28.81
Fog	4	12	3.00	33.33
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	0	310	*	*
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance		-	-	*
Hazardous Materials (Hazmat)	155	22	<0.50	704.55**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	13,038	10	<0.50	130,380.00**
Severe Thunderstorm Events				
Funnel Cloud	2	16	8.00	12.50
Hail	80	59	0.74	135.59**
Heavy Precipitation	4	15	3.75	26.67
Lightning	13	16	1.23	81.25
Thunderstorm & Wind	156	59	<0.50	264.41**
Tornado	15	59	3.93	25.42
Temperature Extremes	3	16	5.33	18.75
Wildfire	1,139	21	<0.50	5,423.81**
Winter Weather (Snow & Ice)	50	59	1.18	84.75

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Cherokee County has a higher probability of loss-producing hail, lightning, thunderstorm, and winter weather events. It is slightly above the mean for drought and flooding. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Hurricanes/tropical storms, and wind, are below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

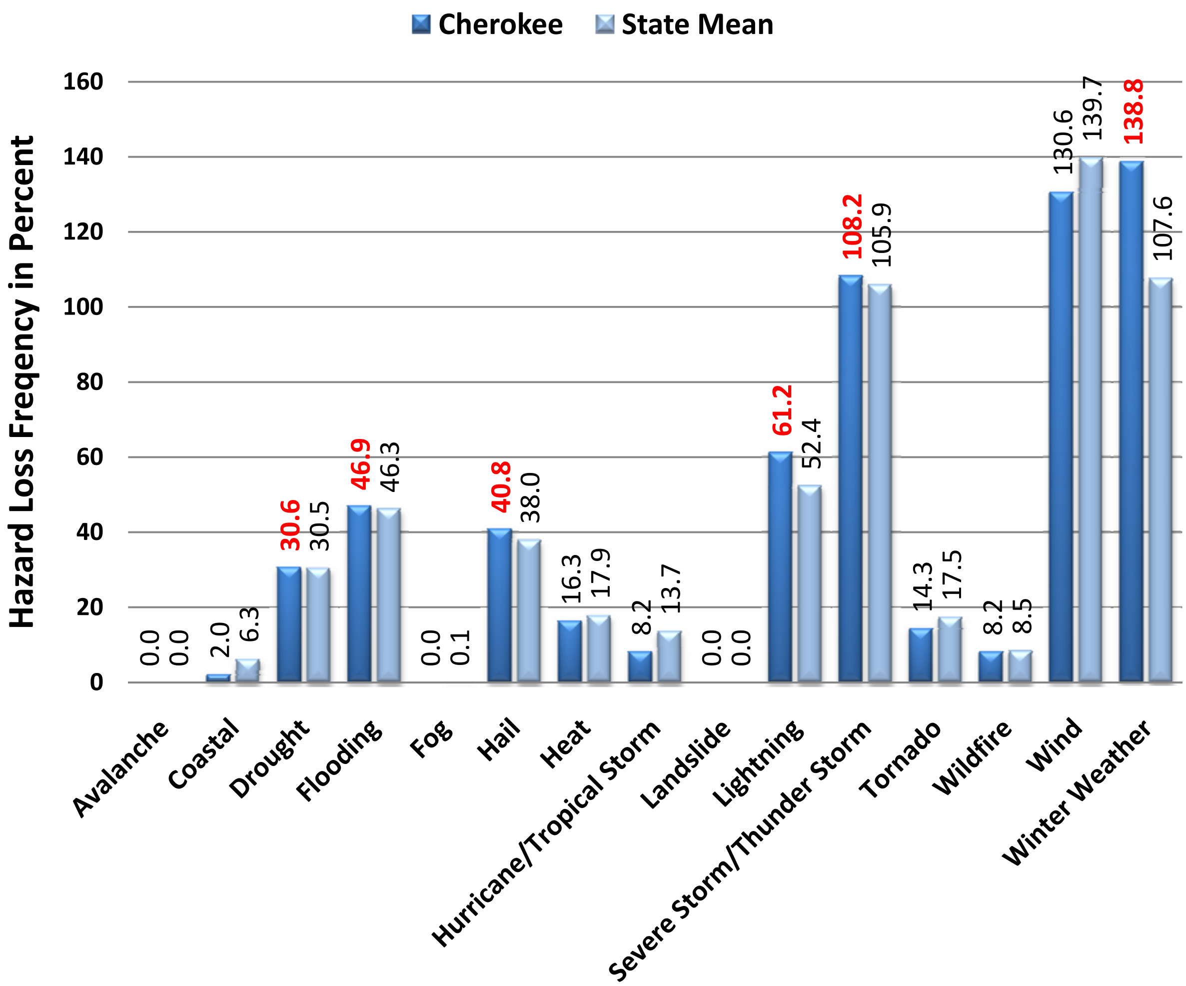


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Cherokee County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Cherokee County exceed $77 million, and are largely due to winter weather (49%), drought, and heat. While significant for the county, these cumulative losses represent less than one percent of the state's total overall. However, 4% of the state's total damages related to winter weather occurred in Cherokee County.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.26%
Flooding	$3,540,673	2.38%
Hail	$1,406,542	1.42%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$1,205,201	0.02%
Lightning	$1,789,217	3.54%
Severe Storm/ Thunder Storm	$2,287,894	1.13%
Tornado	$2,049,880	0.90%
Wildfire	$334,042	2.18%
Wind	$1,283,072	0.91%
Winter Weather	$38,390,648	4.43%
Cherokee - Total	**$77,638,767**	**0.84%**

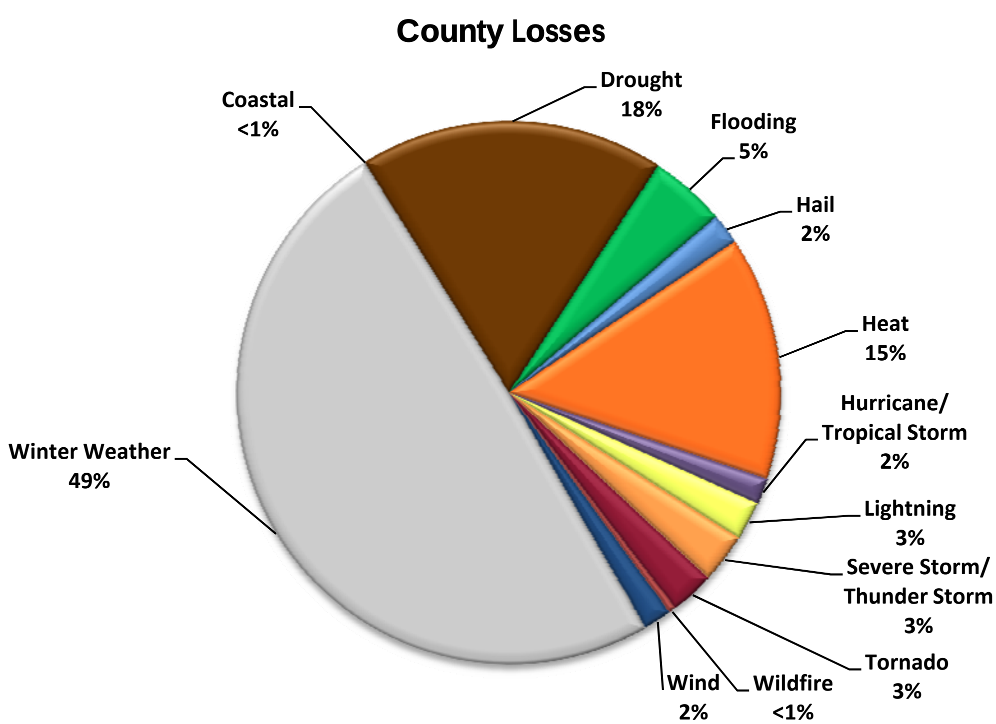
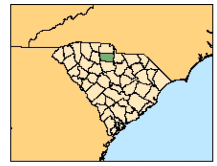


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Cherokee County, SC.

CHESTER COUNTY, SC



Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008

I. Summary

Chester County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Winter weather produces the greatest monetary damage; however, the recurrence interval is 1.5 years, making it a frequent loss-causing hazard. Wildfires, thunderstorms, hail, and hazardous material incidents are some of the prominent hazards within the county.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Chester County, most of the census tracts exhibit moderate levels of social vulnerability. Moderately limited levels of social vulnerability are found in the northeastern corner of the county. Figure 1 provides a map of the Chester County US Census Tracts and their associated social vulnerability.

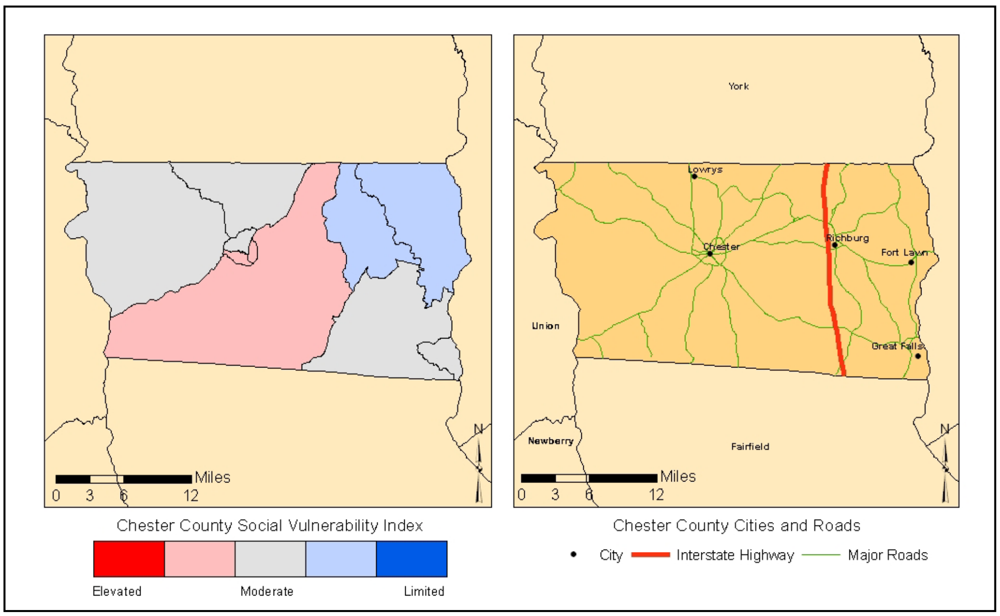


FIGURE 1. The Social Vulnerability for Chester County, SC by US Census tracts.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Chester County are hazardous material accidents, severe thunderstorms and wind, hail, and wildfires. Flooding, ocean & lake surf, and winter weather are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Chester County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	6	158	26.33	3.80
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	51	59	1.16	86.44
Flood	18	59	3.28	30.51
Fog	3	12	4.00	25.00
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	7	310	44.29	2.26
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	102	22	0.22	463.64**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	6,426	10	<0.50	64,260.00**
Severe Thunderstorm Events				
Funnel Cloud	1	16	16.00	6.25
Hail	60	59	0.98	101.69**
Heavy Precipitation	1	15	15.00	6.67
Lightning	0	16	*	*
Thunderstorm & Wind	112	59	0.53	189.83**
Tornado	12	59	4.92	20.34
Temperature Extremes	10	16	1.60	62.50
Wildfire	891	21	<0.50	4,242.86**
Winter Weather (Snow & Ice)	40	59	1.48	67.80

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)

** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year

\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Chester County has a higher probability of loss-producing wildfire and winter weather events and near the state average for drought. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Thunderstorms, wind, hail, and flooding are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

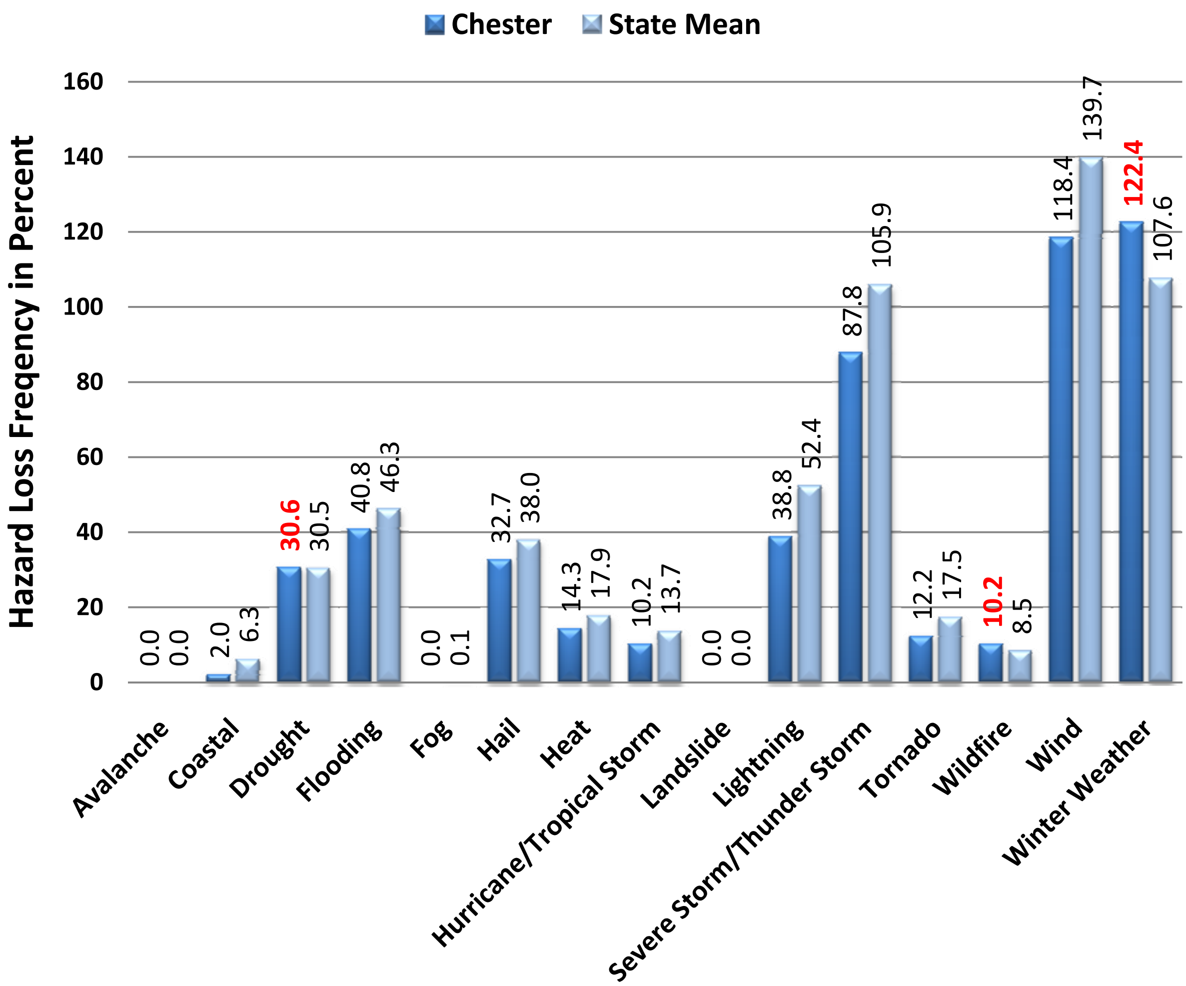


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Chester County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Chester County exceed $76 million, and are largely due to winter weather, followed by hurricanes and tropical storms. While significant for the county, these cumulative losses represent less than one percent of the state's total overall.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.26%
Flooding	$546,214	0.37%
Hail	$302,202	0.30%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$17,668,903	0.33%
Lightning	$241,934	0.48%
Severe Storm/ Thunder Storm	$953,836	0.47%
Tornado	$2,072,722	0.91%
Wildfire	$347,075	2.26%
Wind	$762,046	0.54%
Winter Weather	$28,595,769	3.30%
Chester - Total	**$76,842,300**	**0.84%**

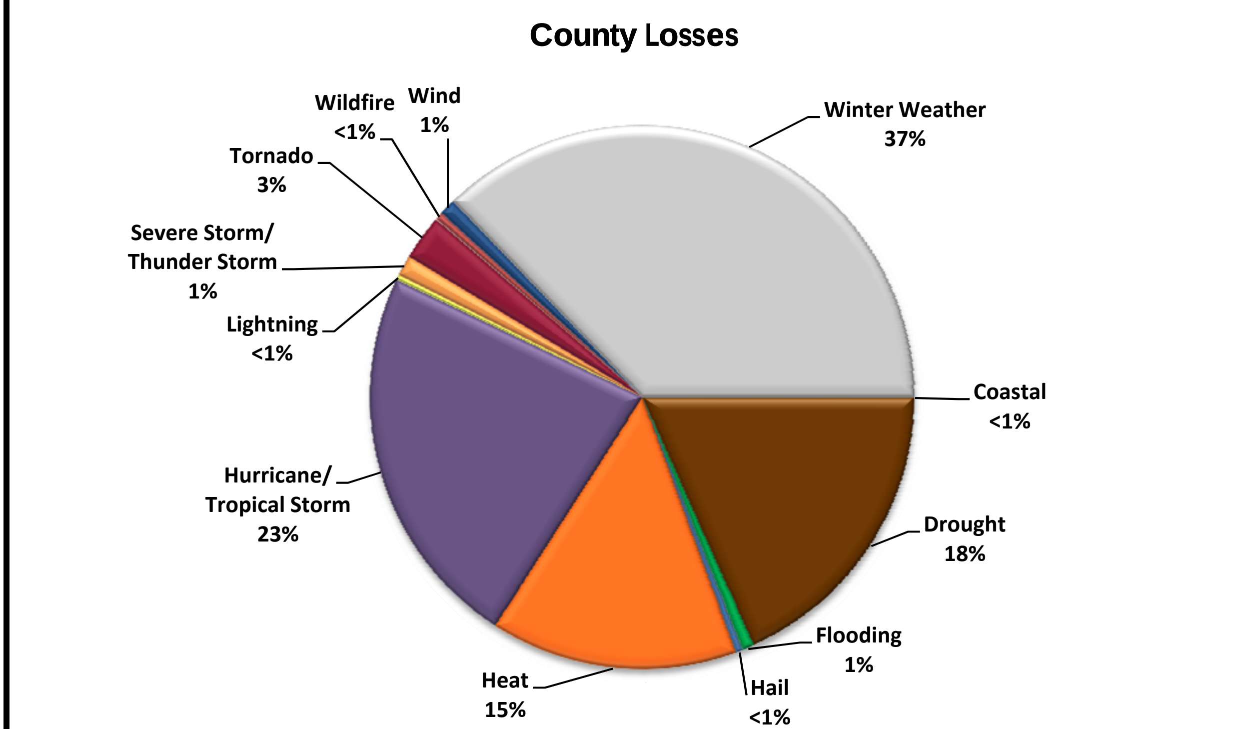
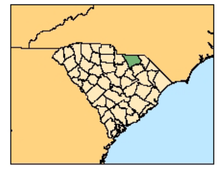


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Chester County, SC.

CHESTERFIELD COUNTY, SC



Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008

I. Summary

Chesterfield County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Hurricane/tropical storms produce the greatest monetary damage to date; however, the recurrence interval is 13.2 years, making it a relatively rare loss-causing hazard. Damages are more likely to occur from the more frequent hazards—winter weather and tornadoes. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Chesterfield County, most of the census tracts exhibit moderately elevated levels of social vulnerability. Figure 1 provides maps of the Chesterfield County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

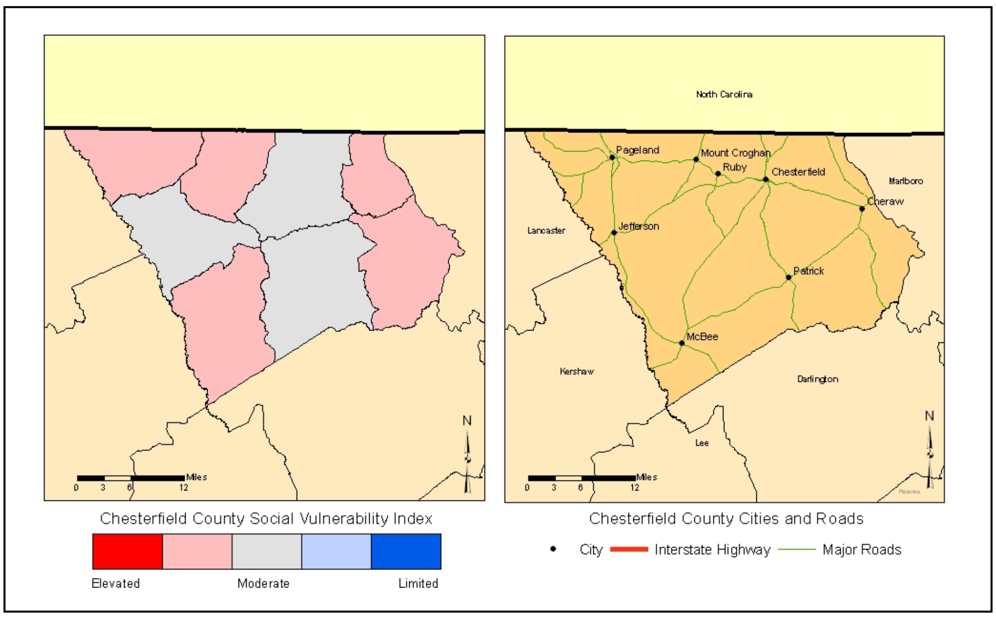


FIGURE 1. The Social Vulnerability for Chesterfield County, SC by US Census tracts and a general reference map of Chesterfield County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.

Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.

Hazard – the potential threat to humans as well as the impact of an event on society and the environment.

Recurrence – a calculated number that examines the expected time interval between events based on the historic record.

Risk – the likelihood or probability of occurrence of a hazard or adverse event.

Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Chesterfield County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Earthquakes and droughts are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Chesterfield County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	12	158	13.17	7.59
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59.00	1.69
Flood	11	59	5.36	18.64
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	2	310	15.00	0.65
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	47	22	<0.50	213.64**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	6,528	10	<0.50	65,280.00**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	54	59	1.09	91.53
Heavy Precipitation	0	15	*	*
Lightning	3	16	5.33	18.75
Thunderstorm & Wind	98	59	0.60	166.10**
Tornado	22	59	2.68	37.29
Temperature Extremes	0	16	*	*
Wildfire	2,668	21	<0.50	12,704.76**
Winter Weather (Snow & Ice)	14	59	4.21	23.73

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)

** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year

\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Chesterfield County has a higher probability of loss-producing winter weather, and wildfire events. The county is around the state average for heat and hurricanes/tropical storms. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Thunderstorms, wind, lightning, and flooding are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

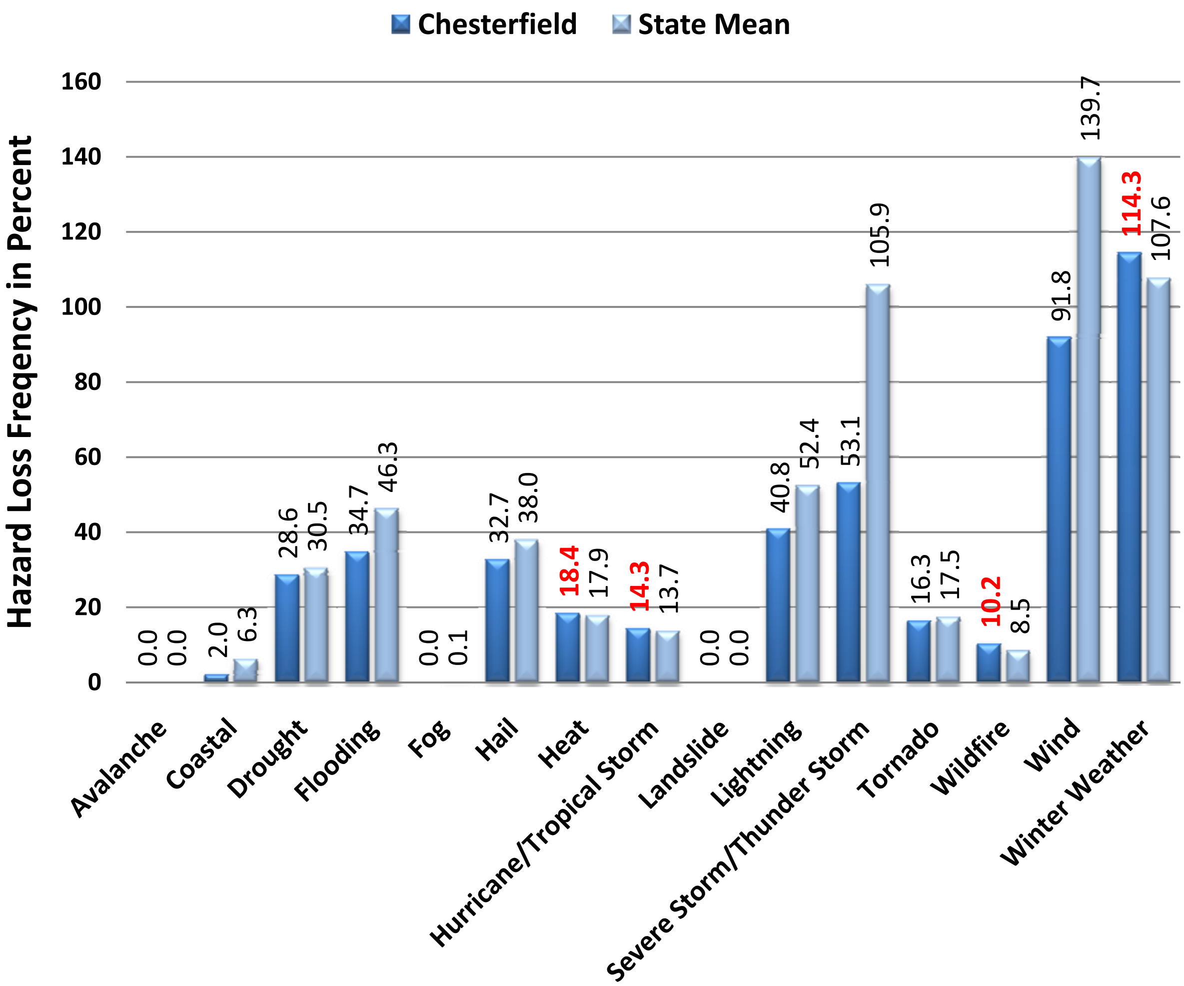


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Chesterfield County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Chesterfield County exceed $85 million, and are largely due to multiple hazards: drought, tornadoes, winter weather, and hurricanes/tropical storms, each contributing roughly 20% to the total. While significant for the county, these cumulative losses represent less than one percent of the state's total overall. However, Chesterfield County contains 7.8% of the state's losses from tornadoes.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,055,942	2.26%
Flooding	$382,597	0.26%
Hail	$364,066	0.37%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$18,049,298	0.34%
Lightning	$258,767	0.51%
Severe Storm/ Thunder Storm	$1,583,648	0.78%
Tornado	$17,846,333	7.84%
Wildfire	$347,075	2.26%
Wind	$6,783,780	4.84%
Winter Weather	$14,524,136	1.68%
Chesterfield - Total	**$85,488,762**	**0.93%**

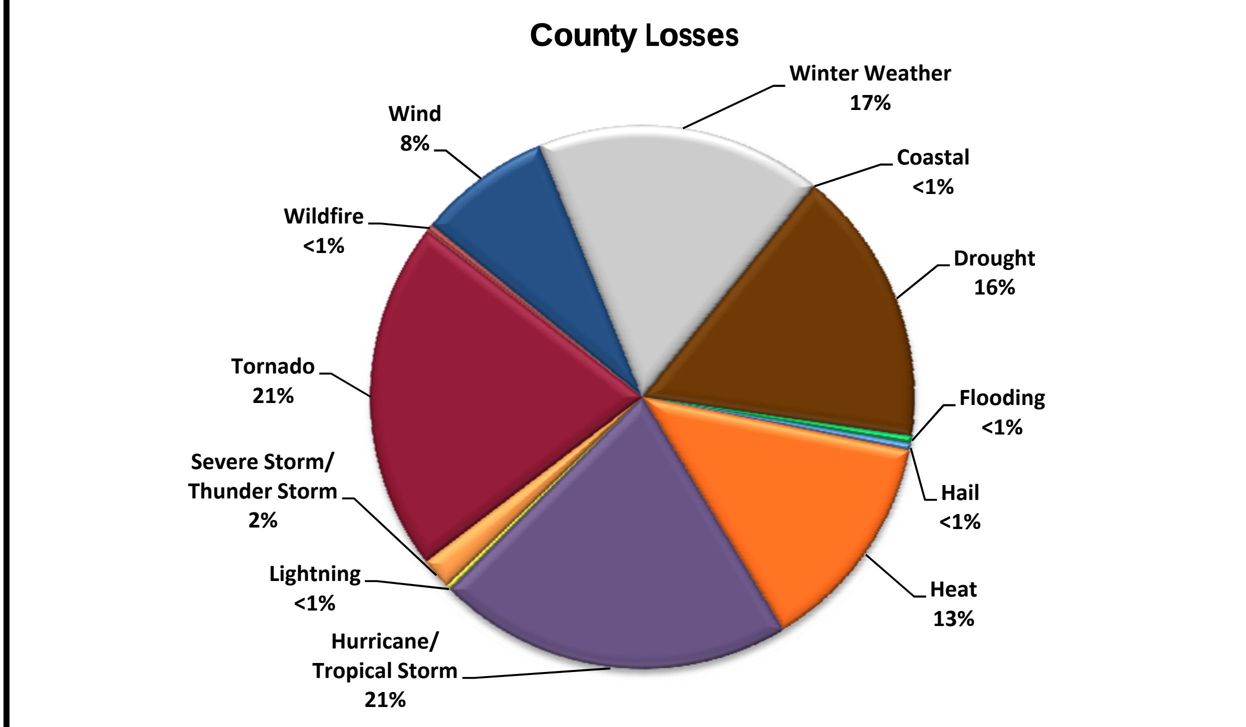
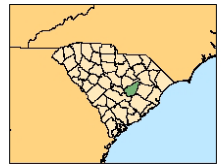


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Chesterfield County, SC.

CLARENDON COUNTY, SC



Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008

I. Summary

Clarendon County is vulnerable to both natural (hurricanes/tropical storms) and technological (hazardous material incidents) hazards. Hurricanes/tropical storms produce the highest monetary damage; however, the recurrence interval is 10.5 years, making it a relatively rare event. Wildfires, thunderstorms, hail, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Clarendon County, most of the census tracts exhibit moderately elevated levels of social vulnerability. Census tracts in the north central and eastern parts of the county have lower SoVI scores when compared to the remainder of the state. Figure 1 provides maps of the Clarendon County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

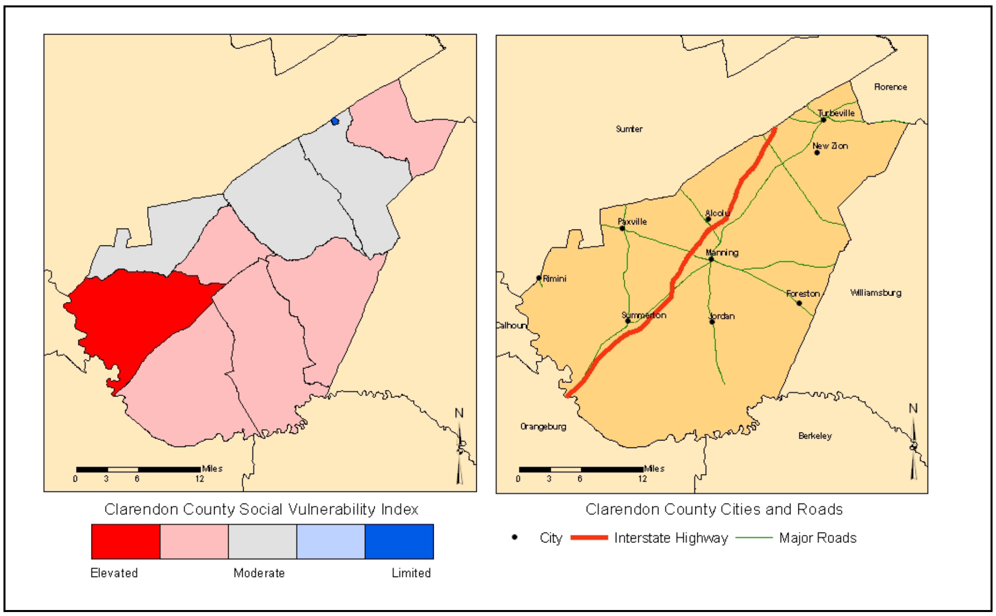


FIGURE 1. The Social Vulnerability for Clarendon County, SC by US Census tracts and a general reference map of Clarendon County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Clarendon County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Earthquake and drought hazards have the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Clarendon County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	15	158	10.53	9.49
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59.00	1.69
Flood	8	59	7.37	13.56
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	1	310	310.00	0.32
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	34	22	0.65	154.55*
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	6,153	10	<0.50	61,530.00*
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	90	59	0.66	152.54*
Heavy Precipitation	0	15	*	*
Lightning	6	16	2.67	37.50
Thunderstorm & Wind	116	59	0.51	196.61*
Tornado	25	59	2.36	42.37
Temperature Extremes	1	16	16.00	6.25
Wildfire	3,519	21	<0.50	16,757.14*
Winter Weather (Snow & Ice)	5	59	11.80	8.47

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Clarendon County has a higher probability of loss-producing heat, lightning, and tornado events. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Thunderstorms, wind, and winter weather are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

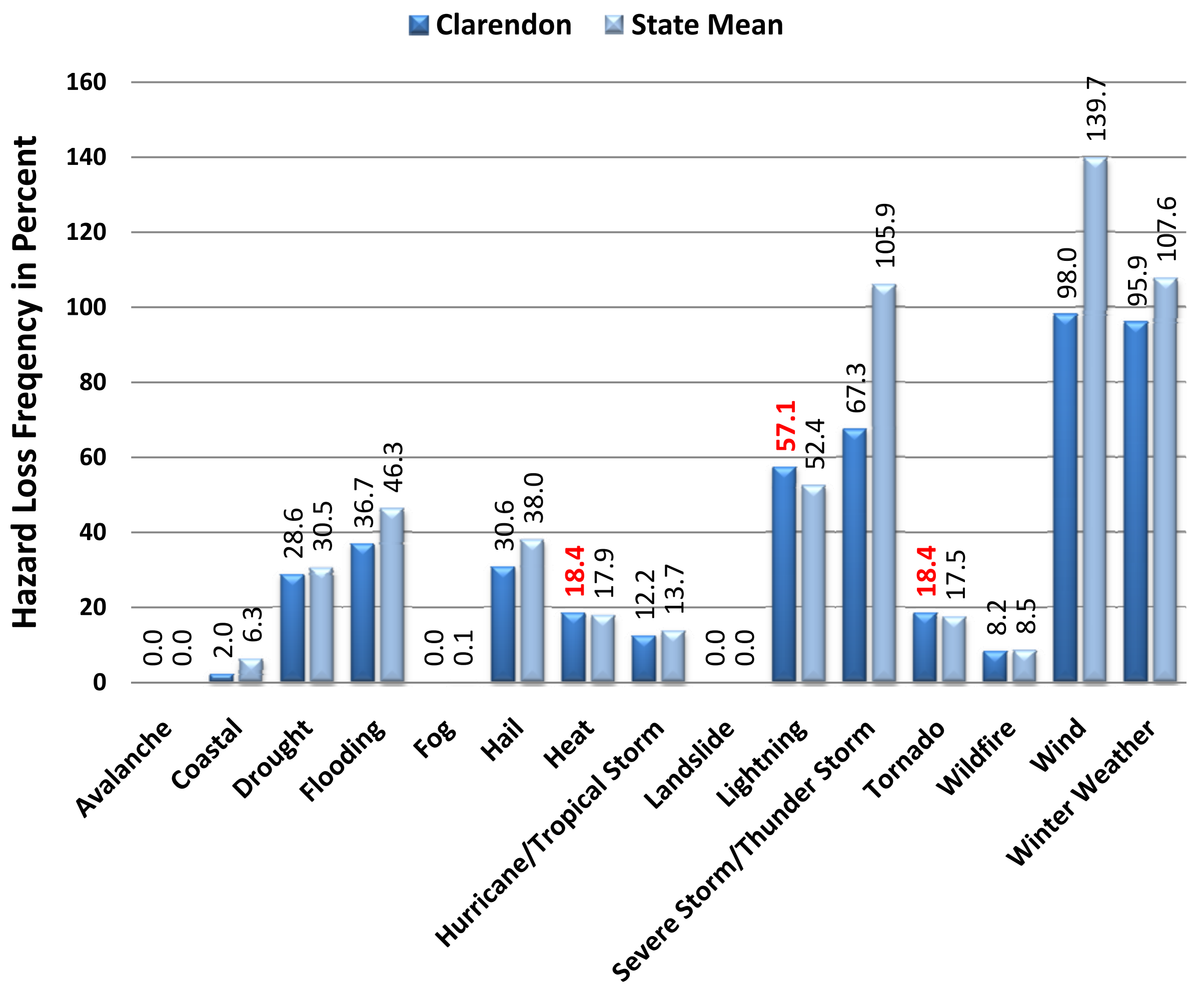


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Clarendon County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the total damage is calculated as the cumulative amount of damage from 1960 to 2008 based on twelve hazard types from the Hazards and Vulnerability Research Institute's SHELDUS database – available at (http://www.sheldus.org). The historic losses in Clarendon County exceed $219 million, and are largely due to hurricanes and tropical storms, followed by winter weather, heat, and drought. Hurricanes/tropical storms represent 80% of the total losses in Clarendon. While significant for the county, these cumulative losses represent 2.4% of the state's overall total, and 3.3% of the state's total damages related to hurricanes/tropical storms.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,055,942	2.26%
Flooding	$447,343	0.30%
Hail	$284,731	0.29%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$174,314,866	3.29%
Lightning	$523,314	1.03%
Severe Storm/ Thunder Storm	$793,356	0.39%
Tornado	$1,575,208	0.69%
Wildfire	$334,042	2.18%
Wind	$769,500	0.55%
Winter Weather	$14,646,945	1.69%
Clarendon - Total	**$219,038,366**	**2.38%**

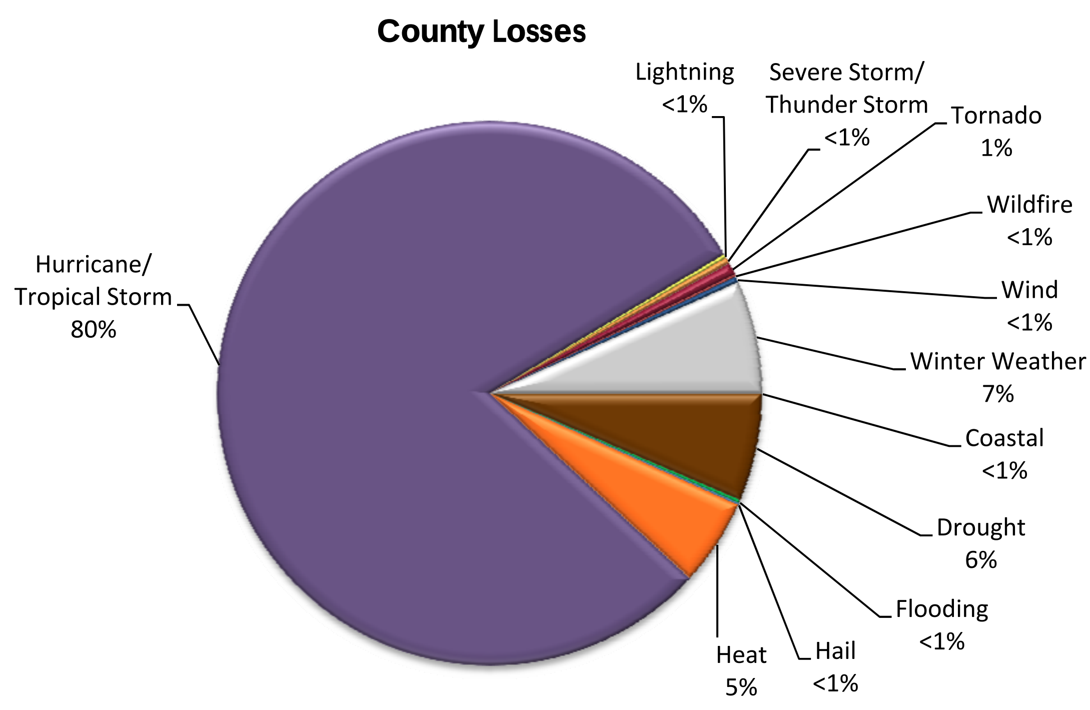
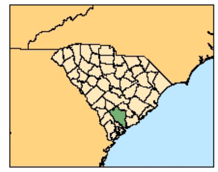


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Clarendon County, SC.

COLLETON COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Colleton County is vulnerable to both natural (hurricanes/tropical storms) and technological (hazardous material incidents) hazards. Droughts, heat, hurricane/tropical storms, and winter weather produce the greatest monetary damages. Winter weather has a recurrence interval of 14.8 years, making it a relatively rare, but costly hazard. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Colleton County, most of the census tracts exhibit moderate levels of social vulnerability. Census tracts in the northern part of the county and in Walterboro have the highest SoVI scores. Figure 1 provides maps of the Colleton County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

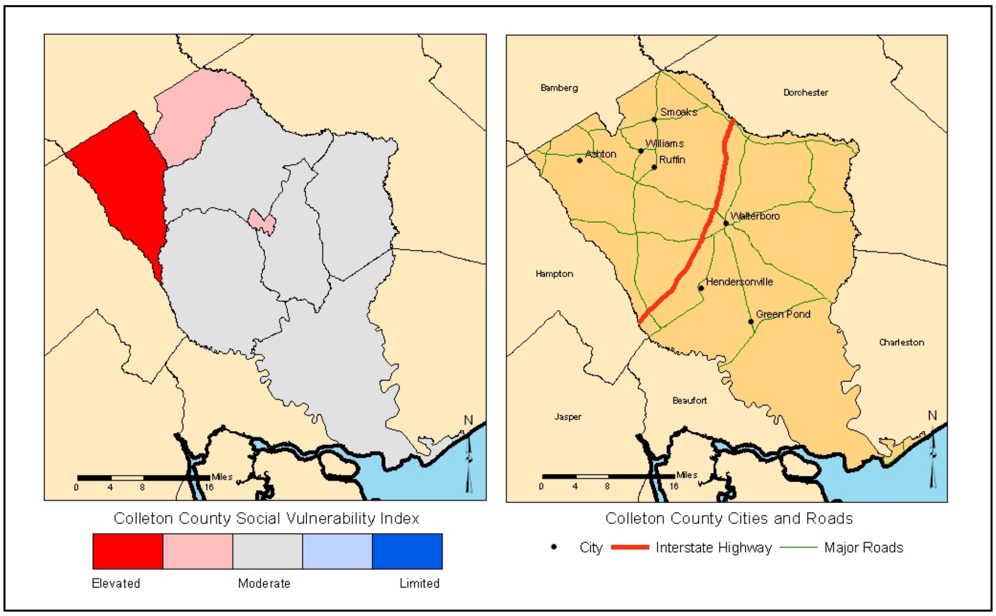


FIGURE 1. The Social Vulnerability for Colleton County, SC by US Census tracts and a general reference map of Colleton County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Colleton County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Earthquakes and winter weather are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Colleton County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	23	158	6.87	14.56
Ocean & Lake Surf[b]	10	16	1.60	62.50
Waterspout	1	16	16.00	6.25
Dam Failure	-	-	-	-
Drought	21	59	2.81	35.59
Flood	14	59	4.21	23.73
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	2	310	15.00	0.65
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	95	22	<0.50	431.82**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	9,331	10	<0.50	93,310.00**
Severe Thunderstorm Events				
Funnel Cloud	2	16	8.00	12.50
Hail	89	59	0.66	150.85**
Heavy Precipitation	0	15	*	*
Lightning	2	16	8.00	12.50
Thunderstorm & Wind	246	59	<0.50	416.95*
Tornado	19	59	3.11	32.00
Temperature Extremes	8	16	2.00	50.00
Wildfire	4,390	21	<0.50	20,904.76**
Winter Weather (Snow & Ice)	4	59	14.75	6.78

[a] Data Sources: National Climatic Data Center (**www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm**); National Geophysical Data Center (**www.ngdc.noaa.gov/hazard/**
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Colleton County has a higher probability of loss-producing coastal, flooding, thunderstorm, wind, drought, and heat events as well as hurricane/tropical storms. This comparison between the county and state can be seen in Figure 2 (page 3) with hazards that exceeded the state mean in red type. Winter weather is well below the state mean indicating that this hazard has historically produced fewer losses for the county when compared to the state as a whole.

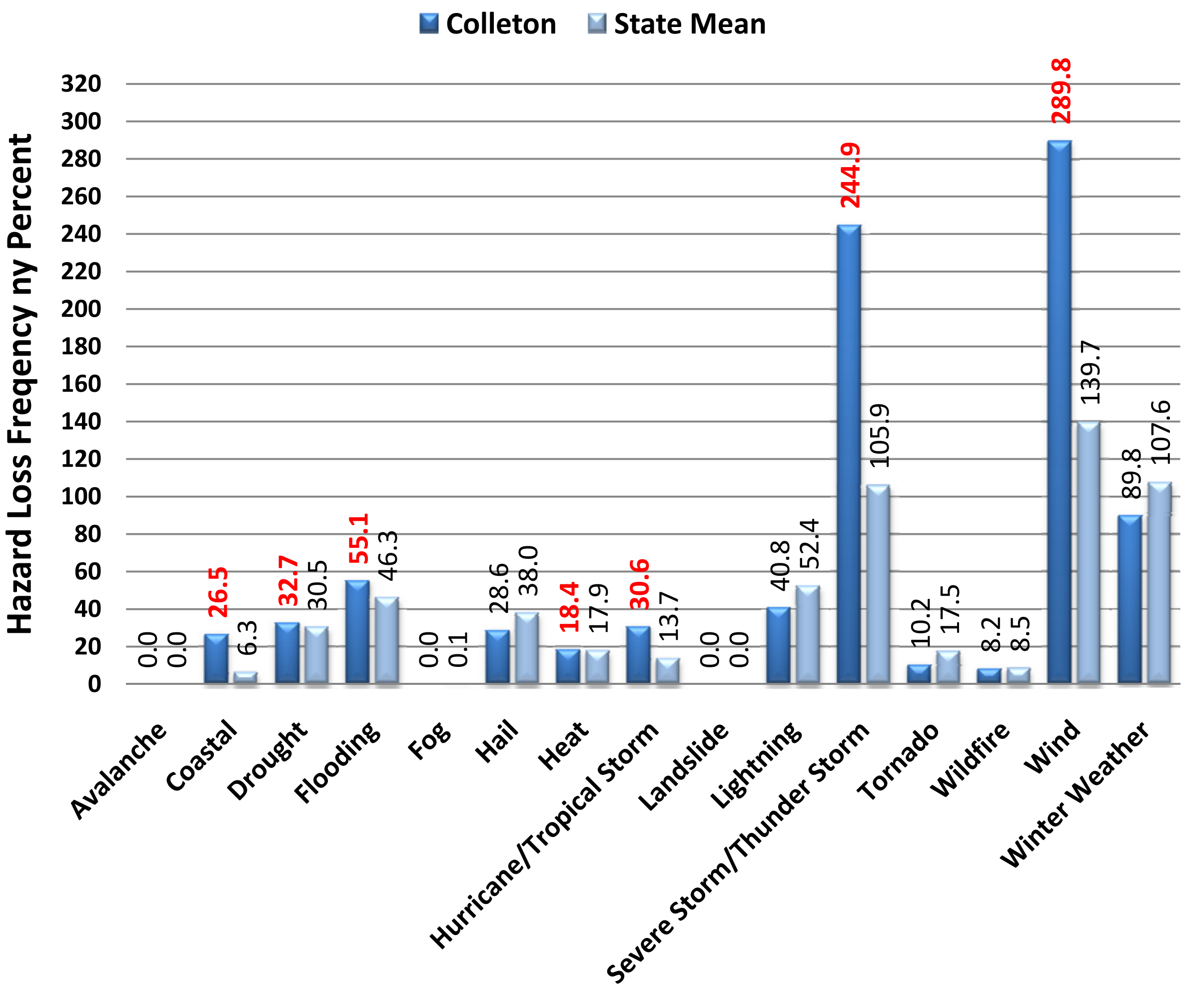


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Colleton County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Colleton County are near $70 million, and are largely due to hurricanes/tropical storms, heat, drought, flooding, and winter weather. While significant for the county, these cumulative losses represent less than one percent of the state's total overall, but 4.8 % of the state's total damages related to flooding.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$5,981,411	0.58%
Drought	$14,201,478	2.28%
Flooding	$7,095,462	4.77%
Hail	$278,191	0.28%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$13,195,236	0.25%
Lightning	$1,120,681	2.22%
Severe Storm/ Thunder Storm	$1,740,220	0.86%
Tornado	$342,427	0.15%
Wildfire	$334,042	2.18%
Wind	$1,451,782	1.03%
Winter Weather	$12,824,274	1.48%
Colleton - Total	**$69,851,747**	**0.76%**

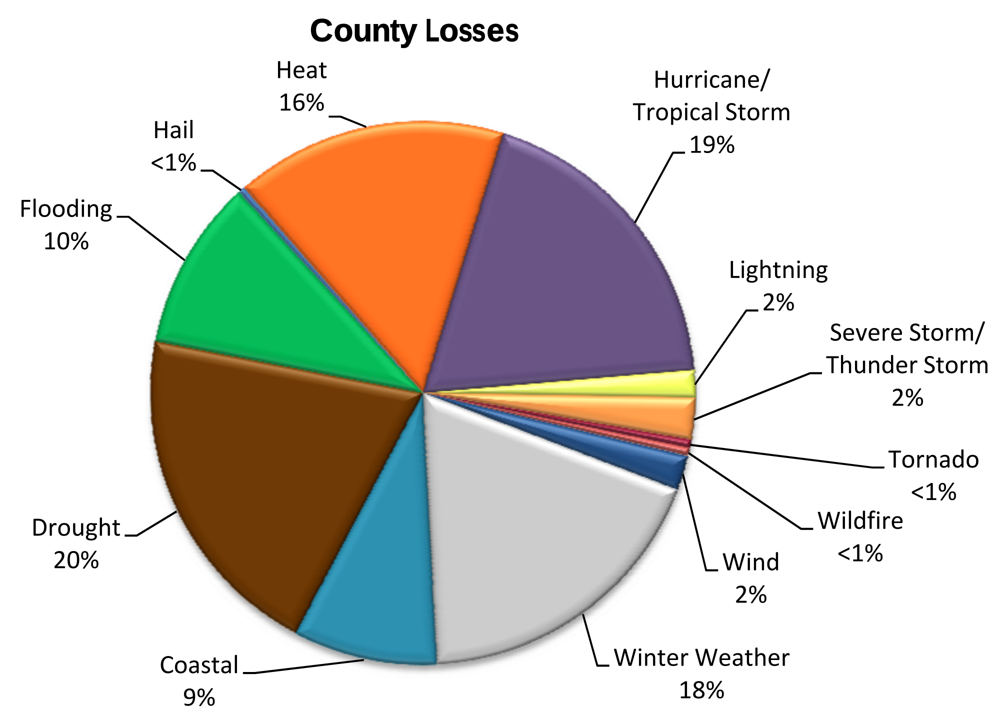
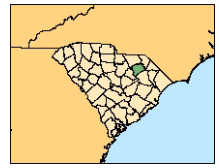


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Colleton County, SC.

DARLINGTON COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Darlington County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Hurricane/tropical storms produce the greatest monetary damage; however, the recurrence interval is 19.8 years, making it a relatively rare event. Wildfires, thunderstorms, hail, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Darlington County, most of the census tracts exhibit moderate levels of social vulnerability. The exceptions are Census tracts in Darlington (city) and in Hartsville, which have high SoVI scores and elevated levels of social vulnerability. Figure 1 provides maps of the Darlington County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

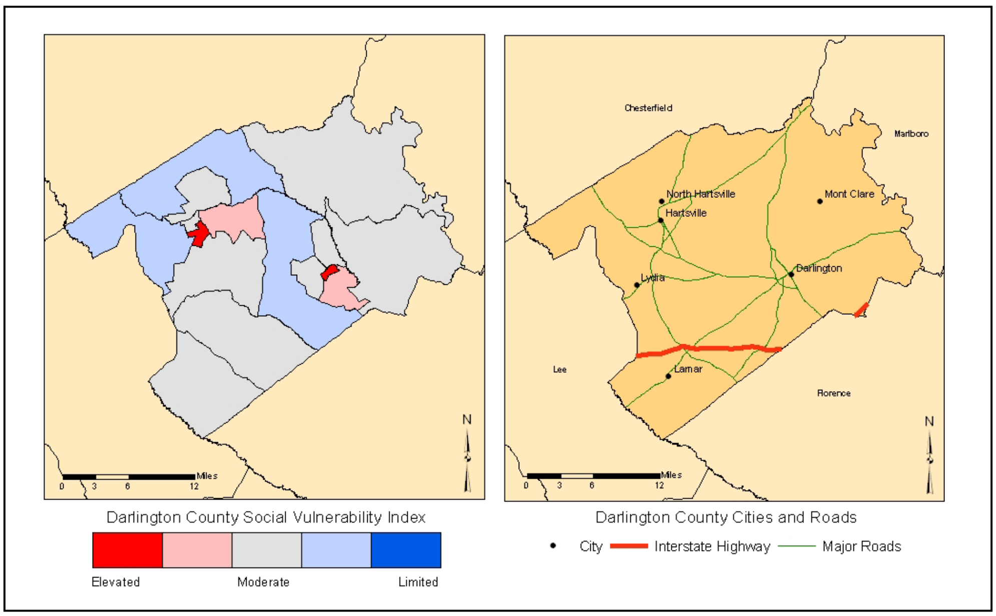


FIGURE 1. The Social Vulnerability for Darlington County, SC by US Census tracts and a general reference map of Darlington County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Darlington County are hazardous material accidents, severe thunderstorms and wind, hail, and wildfires. Hurricanes/tropical storms and ocean/lake surf are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Darlington County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	8	158	19.75	5.06
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	9	59	6.56	15.25
Flood	6	59	9.83	10.17
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	0	310	*	*
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	99	22	<0.50	450.00**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	13,205	10	<0.50	132,050.00**
Severe Thunderstorm Events				
Funnel Cloud	1	16	16.00	6.25
Hail	78	59	0.76	132.20**
Heavy Precipitation	7	15	2.14	46.67
Lightning	5	16	3.20	31.25
Thunderstorm & Wind	135	59	<0.50	228.81**
Tornado	20	59	2.95	33.90
Temperature Extremes	0	16	*	*
Wildfire	2,400	21	<0.50	11,428.57**
Winter Weather (Snow & Ice)	12	59	4.92	20.34

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Darlington County has a higher probability of loss-producing hail, hurricane/tropical storm, tornado, and winter weather events, and is slightly above the state average for heat. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Thunderstorms, wind, and flooding are below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

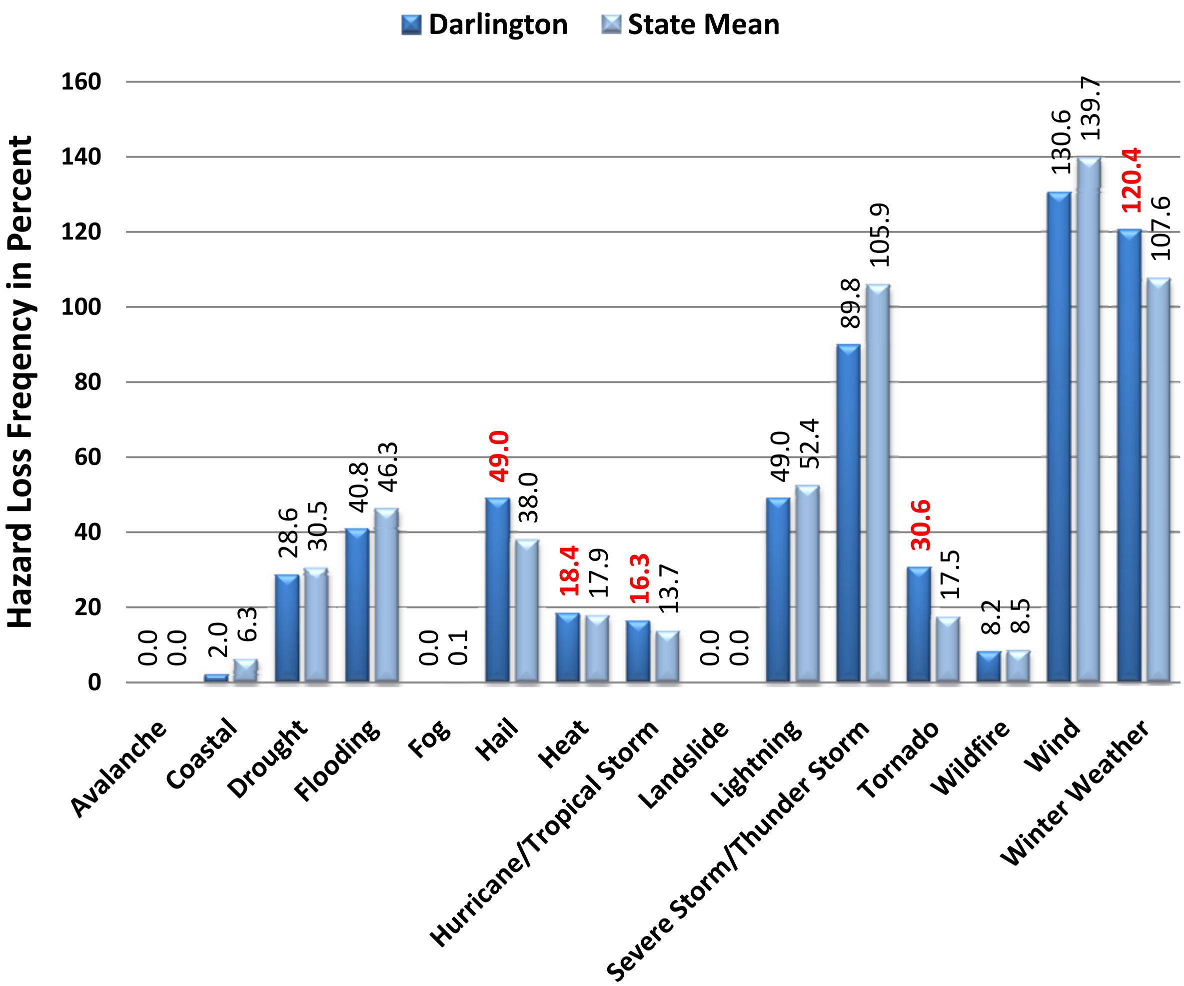


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Darlington County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Georgetown County exceed $150 million, and are largely due to hurricanes and tropical storms, followed by winter weather, and drought. Hurricane/tropical storm represented 64% of the damage in Darlington County. While significant for the county, these cumulative losses represent 1.6% of the state's total overall.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,055,942	2.26%
Flooding	$933,730	0.63%
Hail	$1,252,488	1.26%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$96,101,543	1.81%
Lightning	$335,756	0.66%
Severe Storm/ Thunder Storm	$1,745,696	0.86%
Tornado	$3,102,877	1.36%
Wildfire	$334,042	2.18%
Wind	$1,881,684	1.34%
Winter Weather	$19,928,926	2.30%
Darlington - Total	**$150,965,804**	**1.64%**

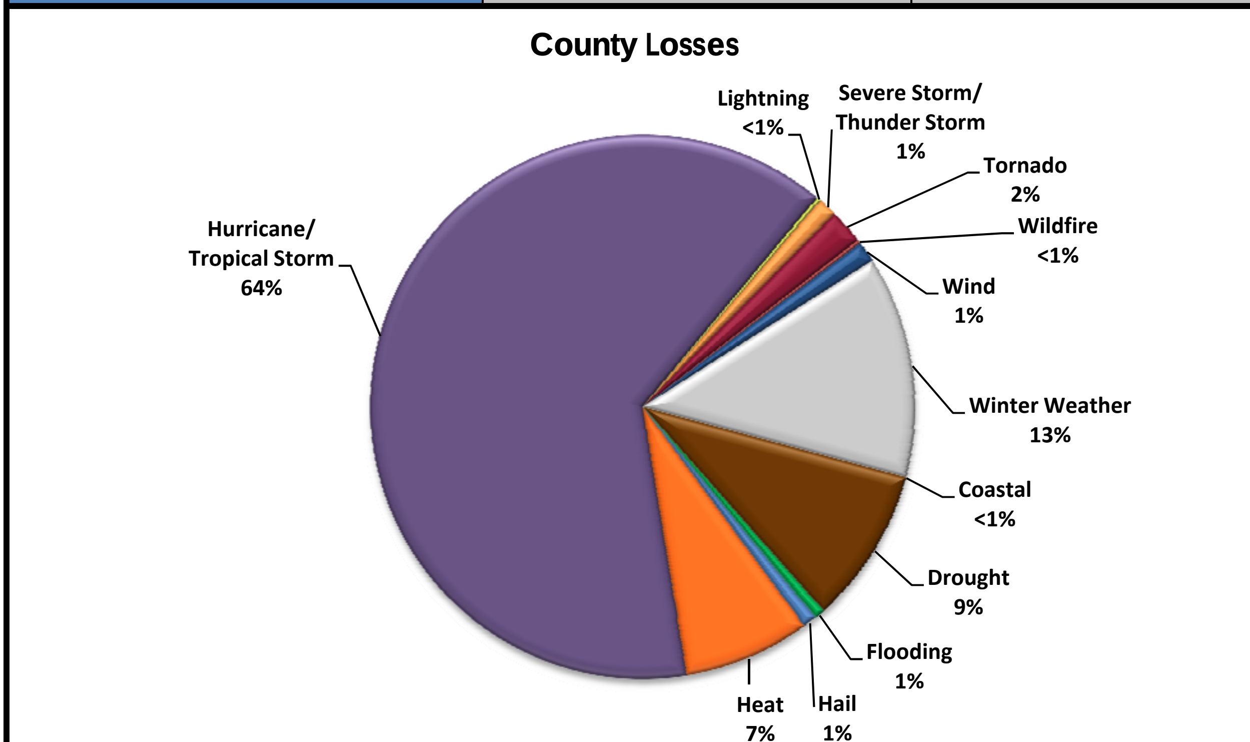
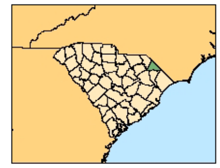


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Darlington County, SC.

DILLON COUNTY, SC



Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008

I. Summary

Dillon County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Winter weather and hurricane/tropical storms produce the greatest monetary damage. However, the recurrence interval for hurricanes is 26.3, while for winter weather it is 5.4 years. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Dillon County, most of the census tracts exhibit moderately elevated levels of social vulnerability. Two Census tracts with high SoVI scores, show elevated levels of social vulnerability. Figure 1 provides maps of the Dillon County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

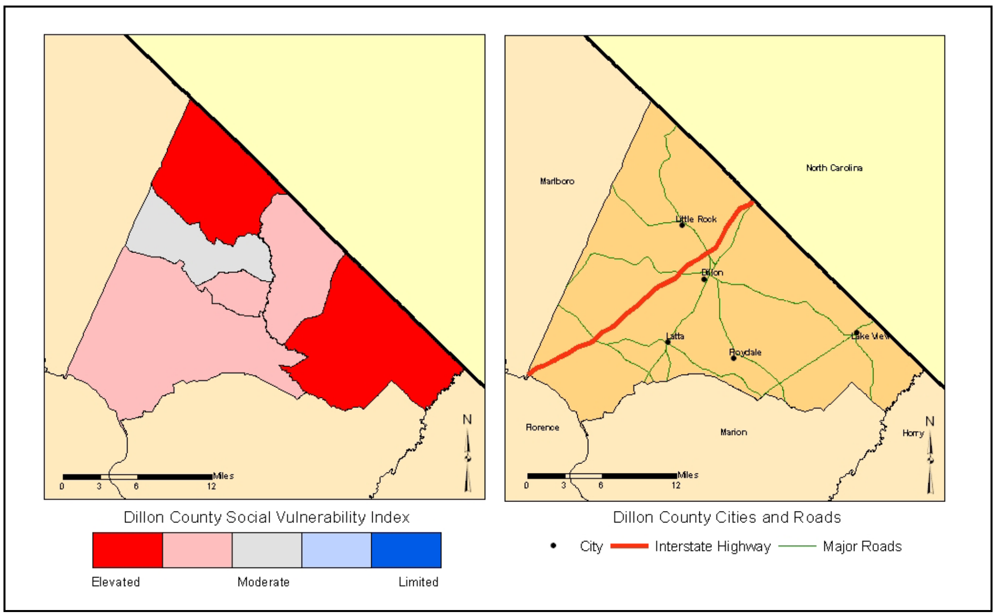


FIGURE 1. The Social Vulnerability for Dillon County, SC by US Census tracts and a general reference map of Dillon County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Dillon County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Hurricanes/tropical storms and drought are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Dillon County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	6	158	26.33	3.80
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	4	59	14.75	6.78
Flood	6	59	9.83	10.17
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	0	310	*	*
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	54	22	<0.50	245.45**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	8,304	10	<0.50	83,040.00**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	53	59	1.11	89.83
Heavy Precipitation	1	15	15.00	6.67
Lightning	2	16	8.00	12.50
Thunderstorm & Wind	102	59	0.58	172.88**
Tornado	14	59	4.21	23.73
Temperature Extremes	0	16	*	*
Wildfire	1,410	21	<0.50	6,714.29**
Winter Weather (Snow & Ice)	11	59	5.36	18.64

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)

** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year

\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Dillon County has a higher probability of loss-producing winter weather, hurricane/tropical storm, and hail events. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Thunderstorms and wind are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

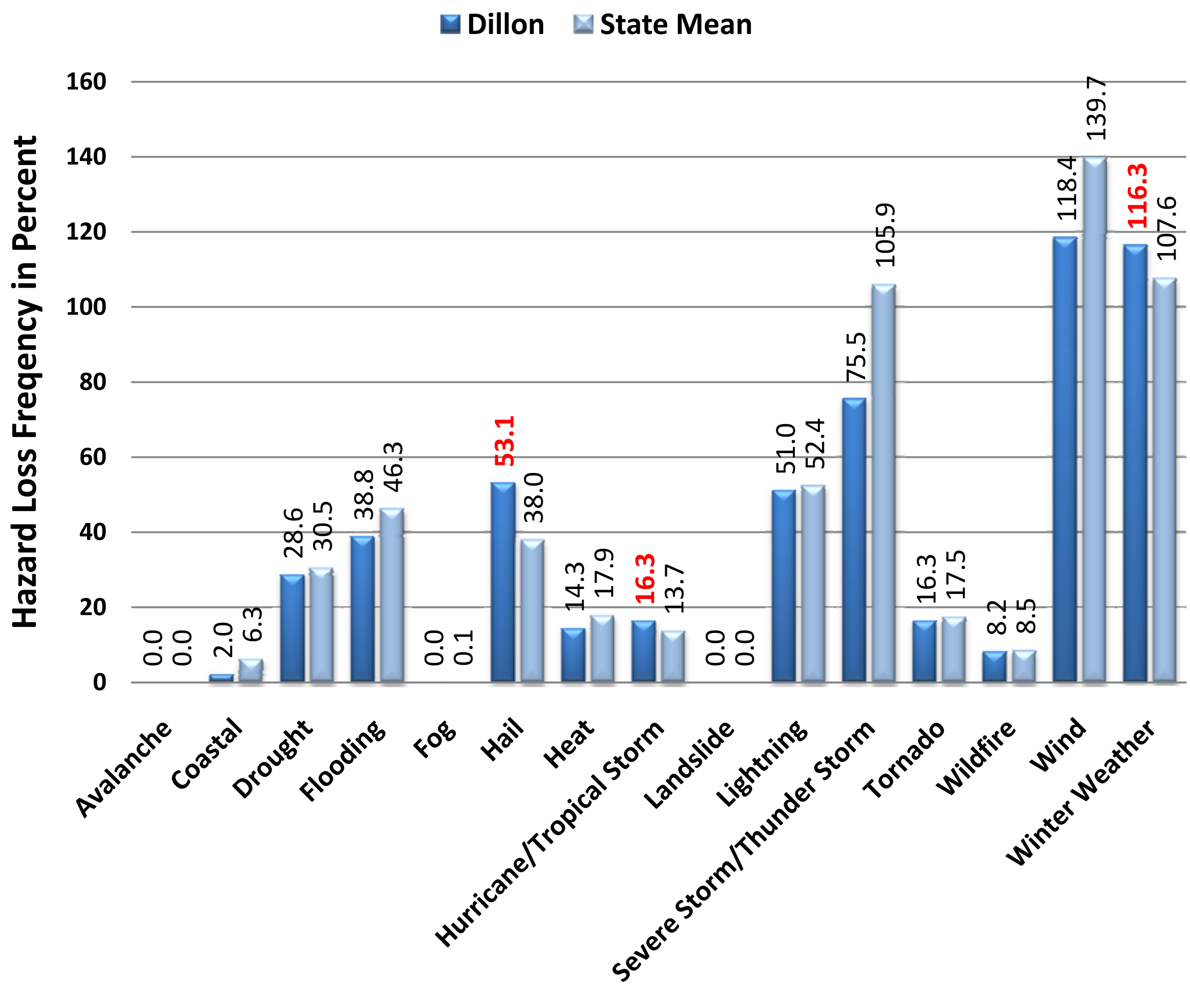


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Dillon County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Dillon County exceed $83 million, and are largely due to winter weather and hurricanes/ tropical storms. While significant for the county, these cumulative losses represent less than one percent of the state's total overall.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,055,942	2.26%
Flooding	$728,014	0.49%
Hail	$1,381,107	1.39%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$18,101,543	0.34%
Lightning	$326,131	0.64%
Severe Storm/ Thunder Storm	$1,611,056	0.79%
Tornado	$6,051,802	2.66%
Wildfire	$334,042	2.18%
Wind	$10,261,259	7.31%
Winter Weather	$19,515,518	2.25%
Dillon - Total	**$83,659,533**	**0.91%**

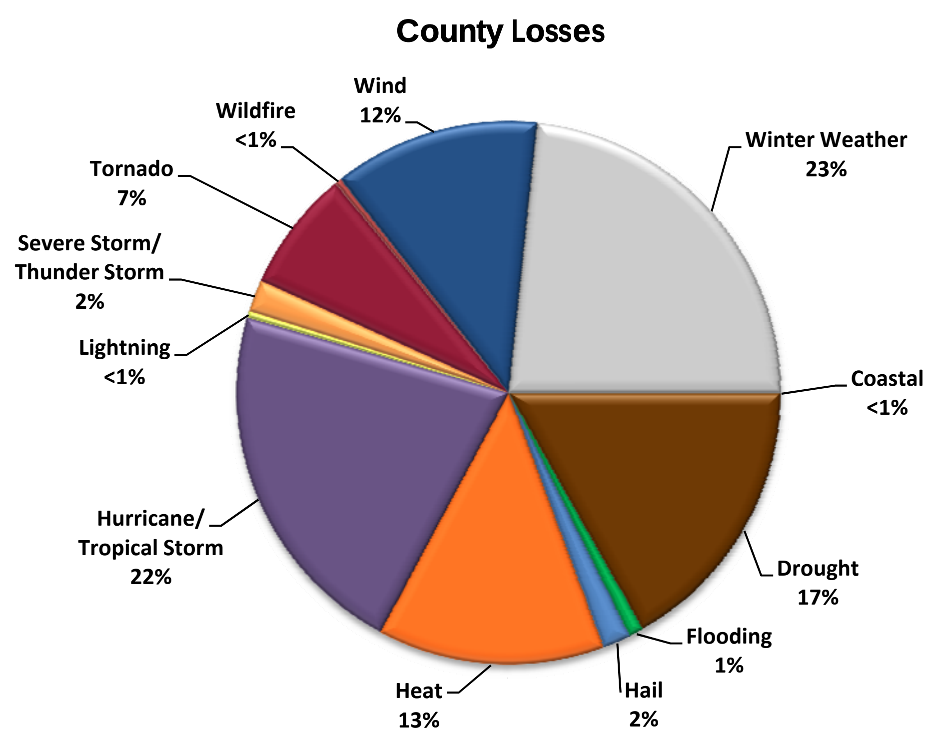
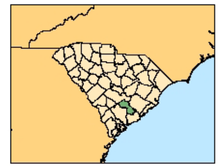


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Dillon County, SC.

DORCHESTER COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Dorchester County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Hurricane/tropical storms produce the greatest monetary damages; however, the recurrence interval is 11.3 years, making it a relatively rare event. Drought is the most frequent costly hazard with a recurrence interval of 2.8 years. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Dorchester County, most of the census tracts exhibit the moderate to limited levels of social vulnerability, with the exception of two tracts—one census tract in the north and the city of Summerville. Figure 1 provides maps of the Dorchester County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

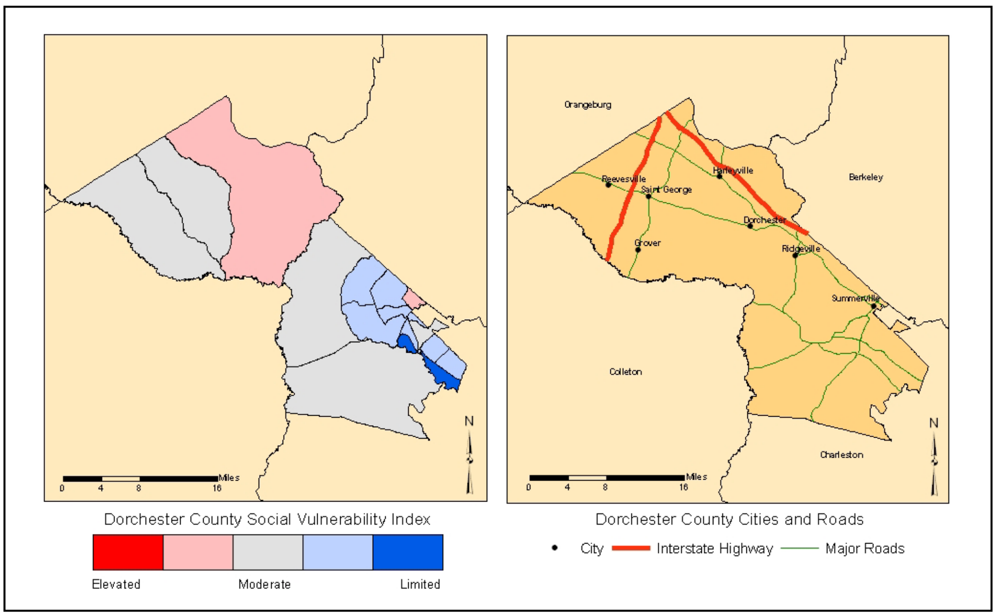


FIGURE 1. The Social Vulnerability for Dorchester County, SC by US Census tracts and a general reference map of Dorchester County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.

Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.

Hazard – the potential threat to humans as well as the impact of an event on society and the environment.

Recurrence – a calculated number that examines the expected time interval between events based on the historic record.

Risk – the likelihood or probability of occurrence of a hazard or adverse event.

Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Dorchester County are hazardous material accidents, severe thunderstorms and wind, and wildfires. The least frequent are hurricanes/tropical storms and winter weather, which have the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Dorchester County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	14	158	11.29	8.86
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	21	59	2.81	35.59
Flood	22	59	2.68	37.29
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	192	310	1.61	61.94
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	170	22	<0.50	772.73**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	21,230	10	<0.50	212,300.00**
Severe Thunderstorm Events				
Funnel Cloud	2	16	8.00	12.50
Hail	98	59	0.60	166.10**
Heavy Precipitation	0	15	*	*
Lightning	11	16	1.45	68.75
Thunderstorm & Wind	184	59	0.32	311.86**
Tornado	16	59	3.69	27.12
Temperature Extremes	9	16	1.78	56.25
Wildfire	2,463	21	<0.50	11,728.57**
Winter Weather (Snow & Ice)	4	59	14.75	6.78

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Dorchester County has a higher probability of loss-producing wind, thunderstorm, heat, and hurricane/tropical storm events. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Hail, lightning, and winter weather are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

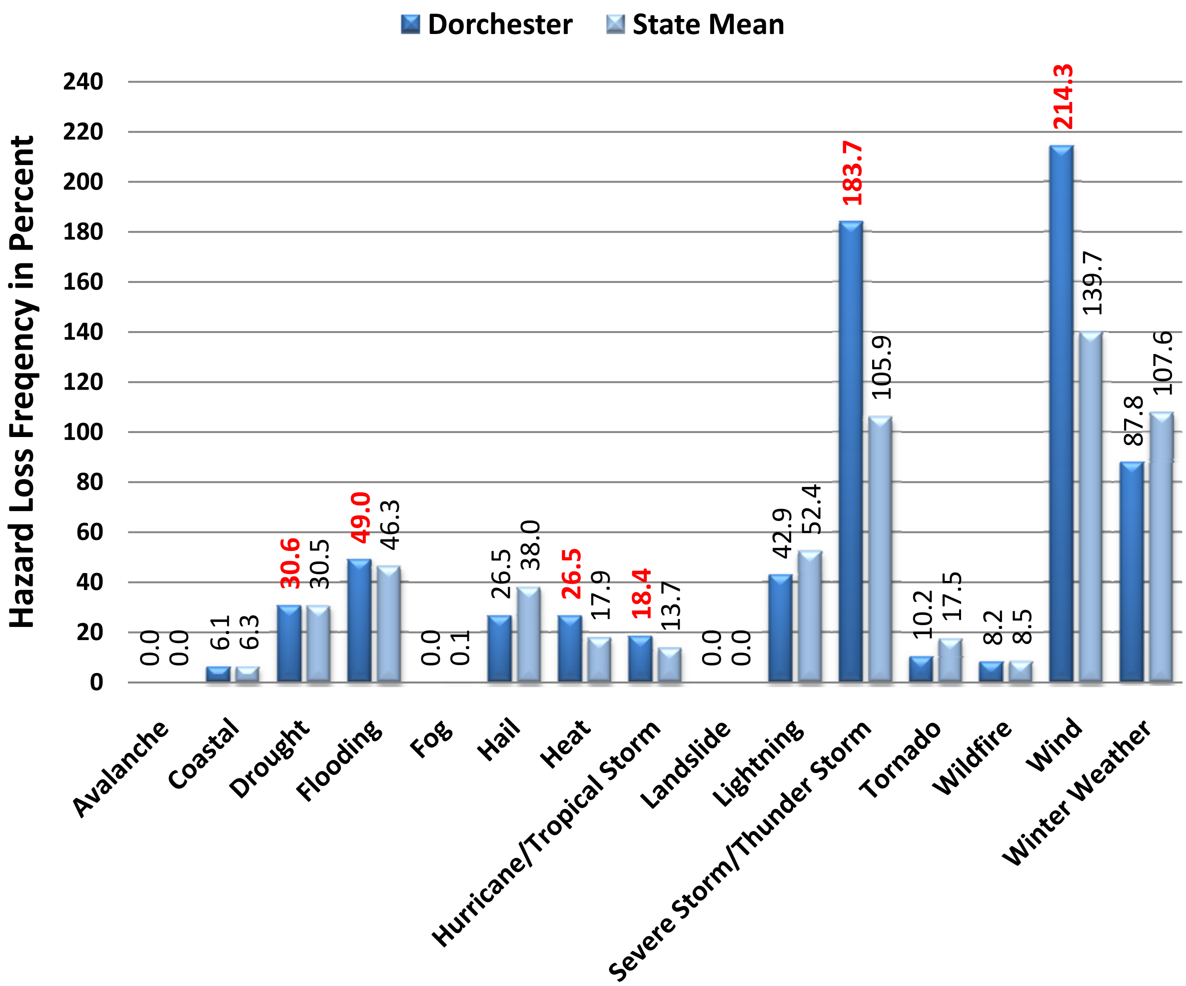


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Dorchester County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Dorchester County exceed $228 million, and are largely due to hurricanes and tropical storms, followed by drought and winter weather. Hurricane/tropical storm represented 79% of the damage in Dorchester County. While significant for the county, these cumulative losses represent 2.5% of the state's total overall, but 3.4% of the state's total damages related to hurricane/tropical storms.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$295,699	0.03%
Drought	$14,058,478	2.26%
Flooding	$1,161,340	0.78%
Hail	$340,734	0.34%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$180,919,981	3.42%
Lightning	$276,625	0.55%
Severe Storm/ Thunder Storm	$1,381,653	0.68%
Tornado	$2,643,993	1.16%
Wildfire	$334,042	2.18%
Wind	$911,461	0.65%
Winter Weather	$14,616,599	1.69%
Dorchester - Total	**$228,227,248**	**2.48%**

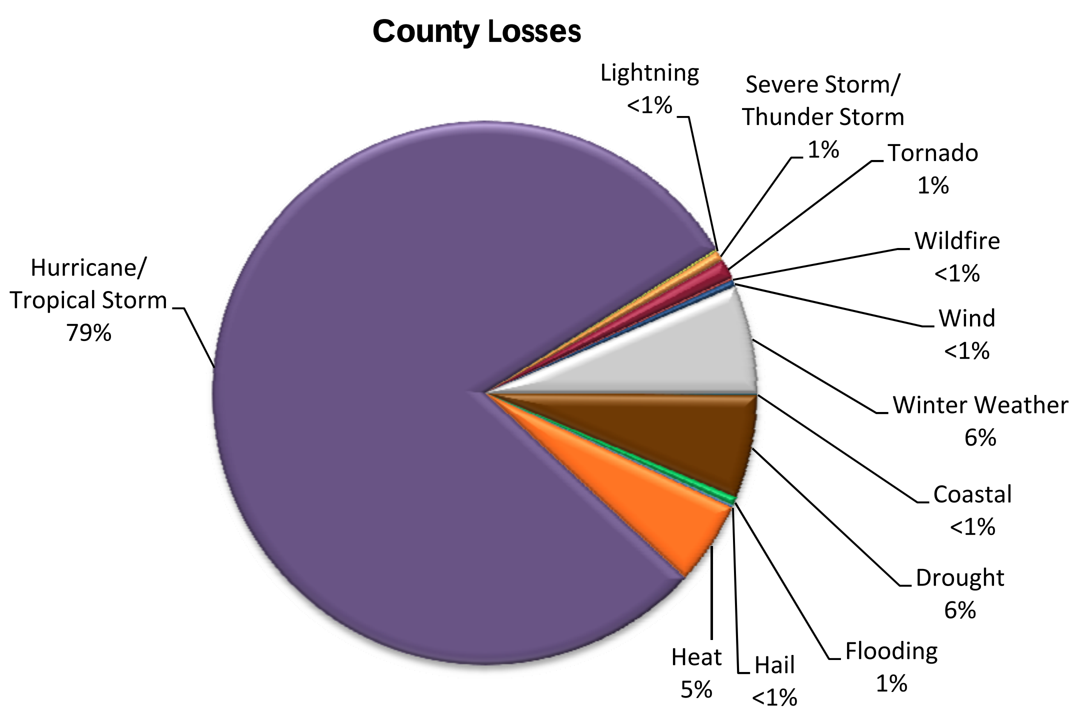
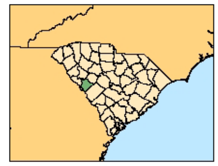


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Dorchester County, SC.

EDGEFIELD COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Edgefield County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Winter weather and drought produce the greatest monetary damage; however, the recurrence interval is 12 and 59 years, respectively making these relatively rare events. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Edgefield County, most of the census tracts show moderate to moderately limited levels of social vulnerability. Only the census tract in the eastern quarter of the county exhibits a moderately high SoVI score. Figure 1 provides maps of the Edgefield County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

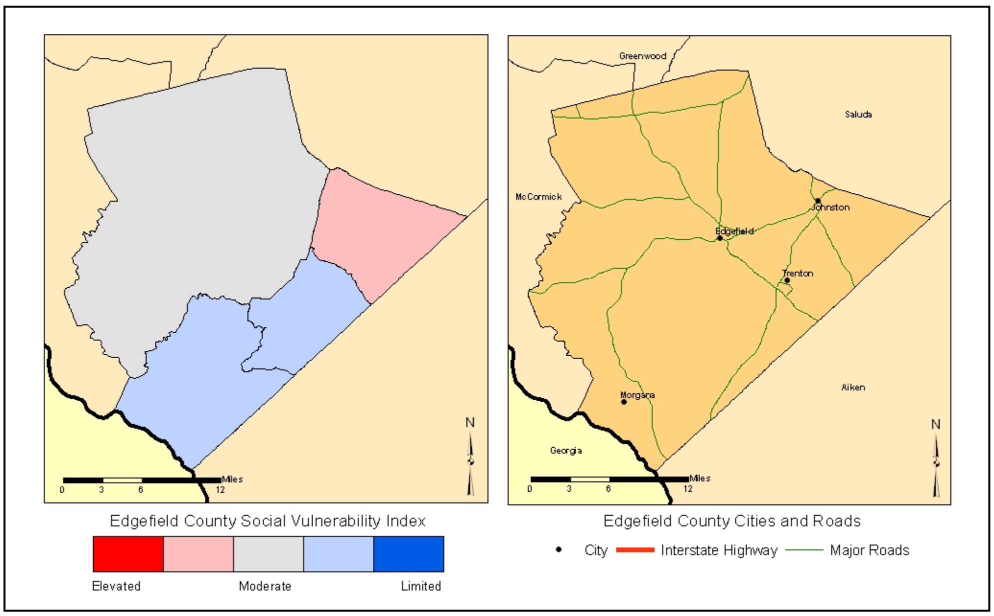


FIGURE 1. The Social Vulnerability for Edgefield County, SC by US Census tracts and a general reference map of Edgefield County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.

Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.

Hazard – the potential threat to humans as well as the impact of an event on society and the environment.

Recurrence – a calculated number that examines the expected time interval between events based on the historic record.

Risk – the likelihood or probability of occurrence of a hazard or adverse event.

Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Edgefield County are hazardous material accidents, severe thunderstorms and wind, and wildfires. The least common are earthquakes, hurricanes/tropical storms, and flooding. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Edgefield County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	3	158	52.67	1.90
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59.00	1.69
Flood	3	59	19.67	5.08
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	3	310	103.33	0.97
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	38	22	0.58	172.73**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	3,530	10	<0.50	35,300.00**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	48	59	1.23	81.36
Heavy Precipitation	0	15	*	*
Lightning	0	16	*	*
Thunderstorm & Wind	76	59	0.78	128.81*
Tornado	15	59	3.93	25.42
Temperature Extremes	0	16	*	*
Wildfire	674	21	<0.50	3,209.52*
Winter Weather (Snow & Ice)	5	59	11.80	8.47

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Edgefield County has a slightly higher probability of loss-producing drought and tornado events. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Severe summer weather and winter weather are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

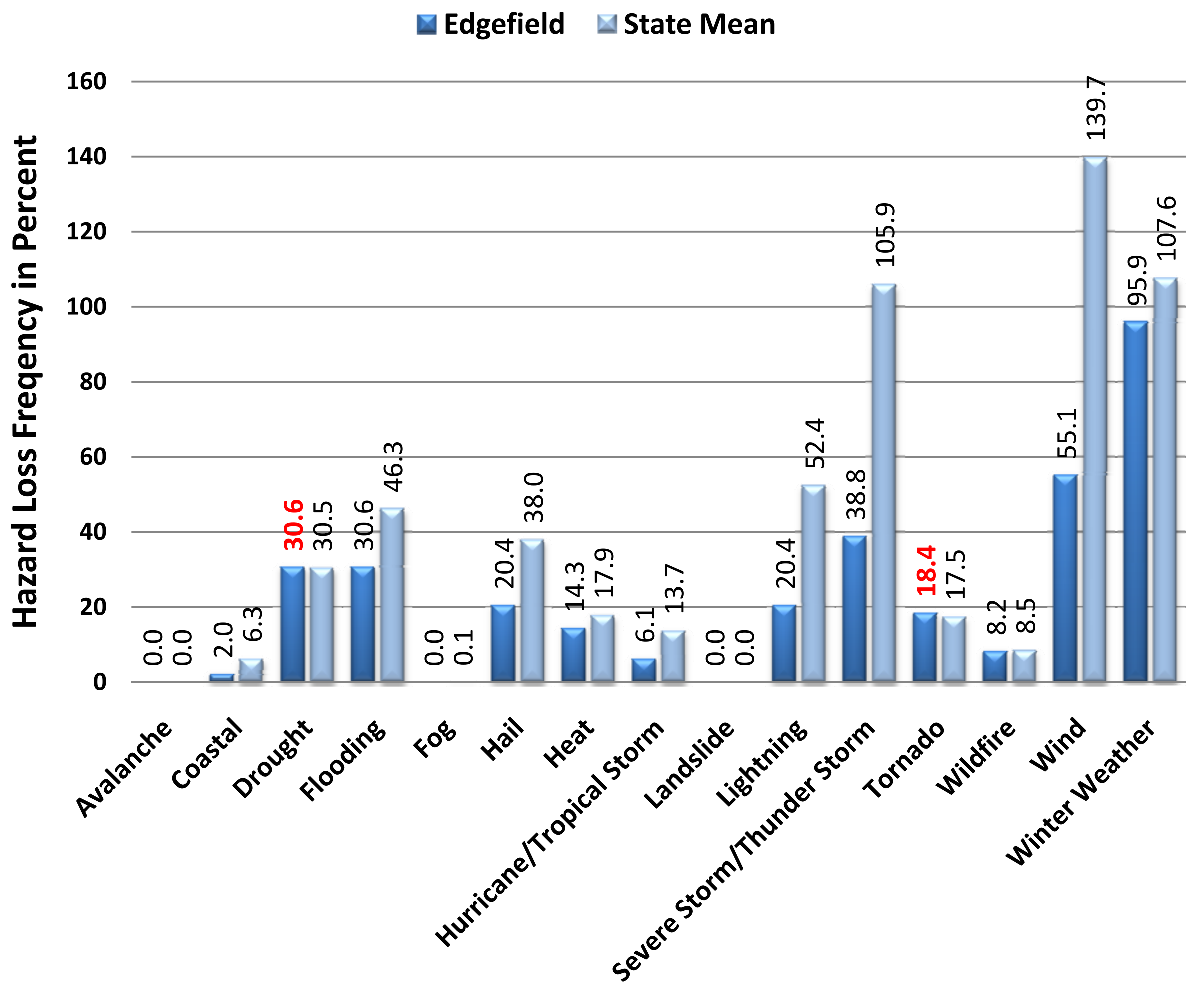


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Edgefield County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Edgefield County exceed $48 million, and are largely due to winter weather, drought, heat, and tornadoes. While significant for the county, these cumulative losses represent less than one percent of the state's overall total.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.26%
Flooding	$513,631	0.34%
Hail	$868,250	0.87%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$329,868	0.01%
Lightning	$150,860	0.30%
Severe Storm/ Thunder Storm	$556,821	0.27%
Tornado	$4,788,848	2.10%
Wildfire	$334,042	2.18%
Wind	$366,231	0.26%
Winter Weather	$15,096,552	1.74%
Edgefield - Total	**$48,356,701**	**0.53%**

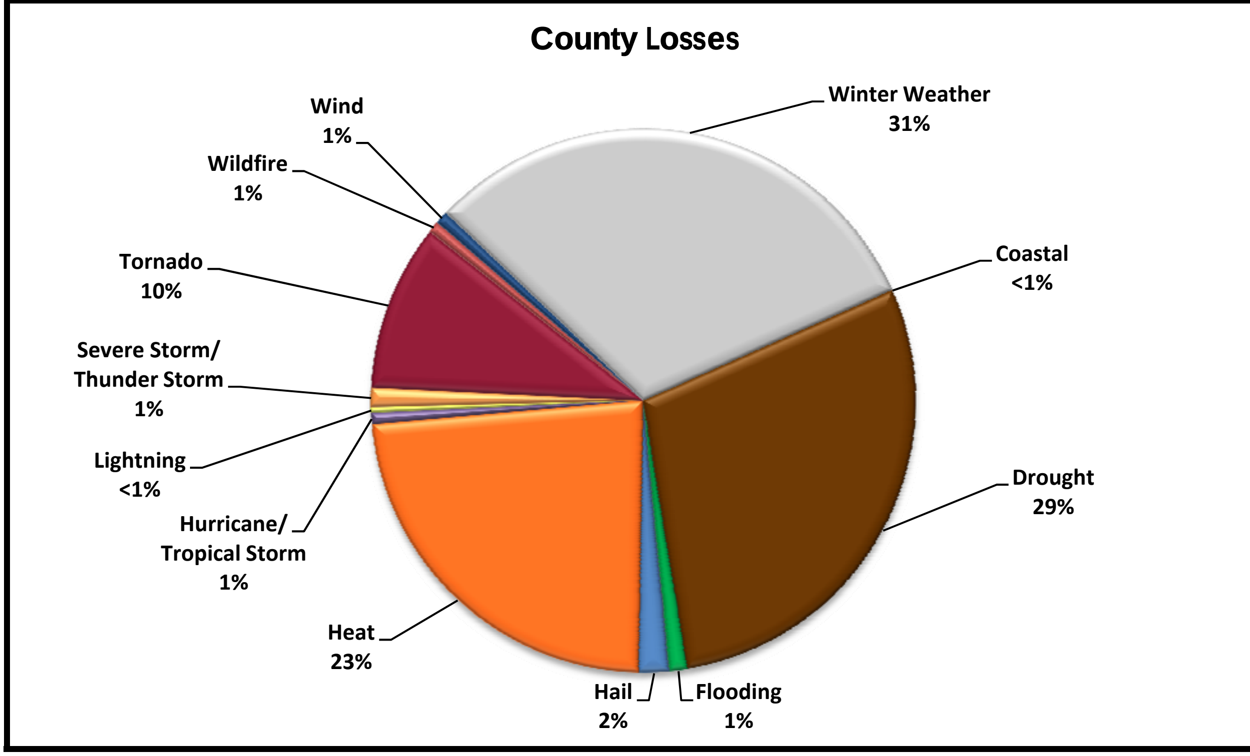
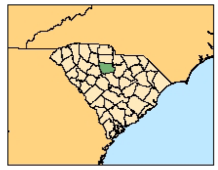


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Edgefield County, SC.

FAIRFIELD COUNTY, SC



Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008

I. Summary

Fairfield County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents). Winter weather produces the greatest monetary damage with a recurrence interval of 5 years. Drought events also produce significant damages but are less frequent. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Fairfield County, most of the census tracts are in the moderately elevated levels of social vulnerability. Figure 1 provides maps of the Fairfield County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

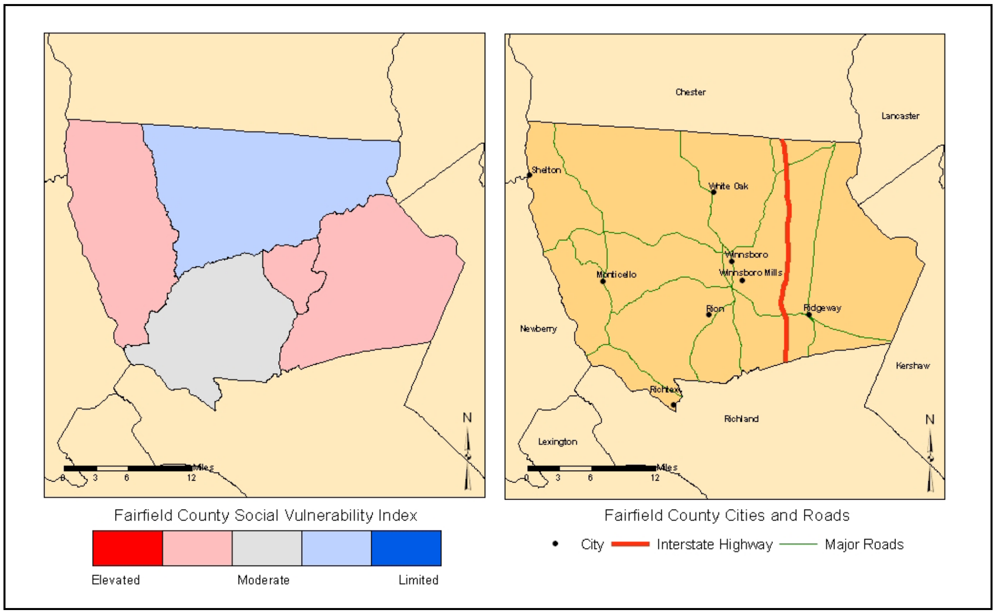


FIGURE 1. The Social Vulnerability for Fairfield County, SC by US Census tracts and a general reference map of Fairfield County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Fairfield County are hazardous material accidents, severe thunderstorms and wind, wildfires, and earthquakes. Flooding, hurricanes/tropical storms, and drought are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Fairfield County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	10	158	15.80	6.33
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59.00	1.69
Flood	3	59	19.67	5.08
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	555	310	0.56	179.03**
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	77	22	<0.50	350.00**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	4,556	10	<0.50	45,560**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	46	59	1.28	77.97
Heavy Precipitation	0	15	*	*
Lightning	0	16	*	*
Thunderstorm & Wind	110	59	0.54	186.44**
Tornado	20	59	2.95	33.90
Temperature Extremes	1	16	16.00	6.25
Wildfire	1,346	21	<0.50	6,409.52**
Winter Weather (Snow & Ice)	12	59	4.92	20.34

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Fairfield County has a higher probability of loss-producing winter weather events, and is slightly above the state average for hail and drought. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Thunderstorms and wind are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

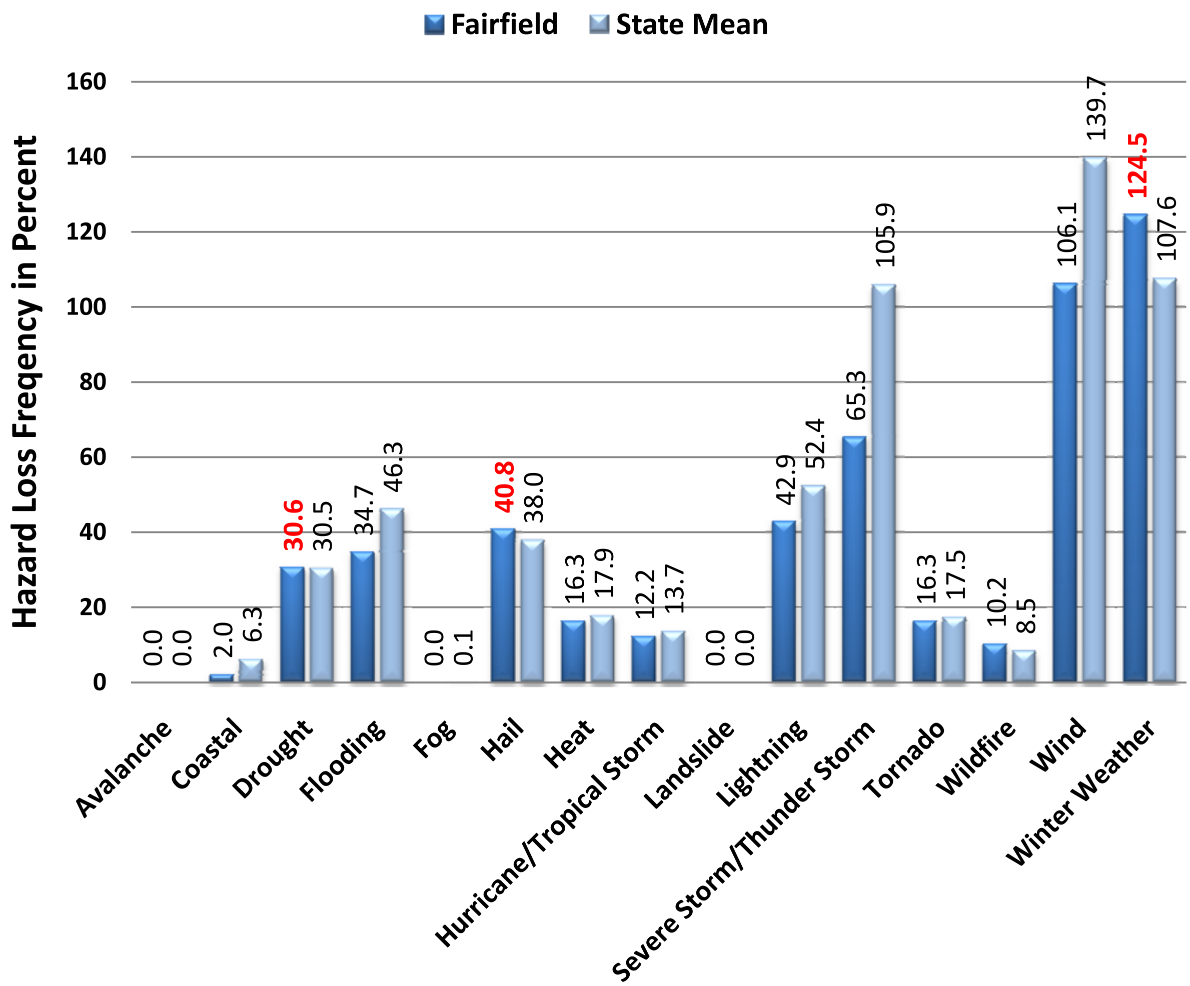


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Fairfield County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Fairfield County exceed $66 million, and are largely due to a combination of winter weather, drought, heat, and hurricanes and tropical storms. While significant for the county, these cumulative losses represent less than one percent of the state's total overall, but 4% of the state's total damages related to hail.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$380,877	0.25%
Hail	$4,311,971	4.18%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$10,514,866	0.19%
Lightning	$262,226	0.50%
Severe Storm/ Thunder Storm	$687,405	0.33%
Tornado	$4,514,201	1.91%
Wildfire	$347,075	2.17%
Wind	$4,166,668	2.86%
Winter Weather	$15,590,612	1.73%
Fairfield - Total	**$66,127,499**	**0.66%**

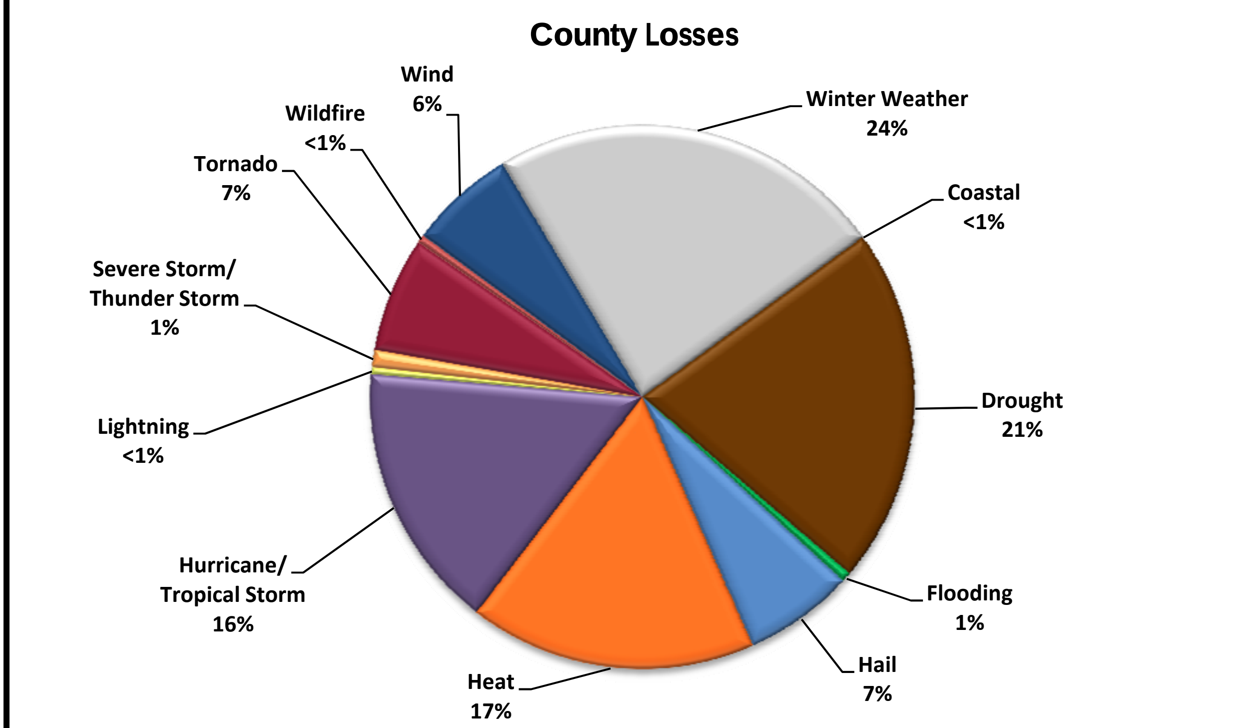
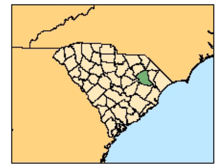


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Fairfield County, SC.

FLORENCE COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Florence County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Hurricane/tropical storms produce the greatest monetary damage; however, the recurrence interval for hurricanes is 19.8 years, making it a rare event. Wildfires, thunderstorms, hail, and hazardous material incidents are some of the prominent hazards within the county.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Florence County, most of the census tracts exhibit moderate range of social Vulnerability. In Florence City there are tracts with elevated vulnerability (higher SoVI scores), as well as moderately elevated tracts in the southern portion of the county Figure 1 provides a map of the Florence County US Census Tracts and their associated social vulnerability.

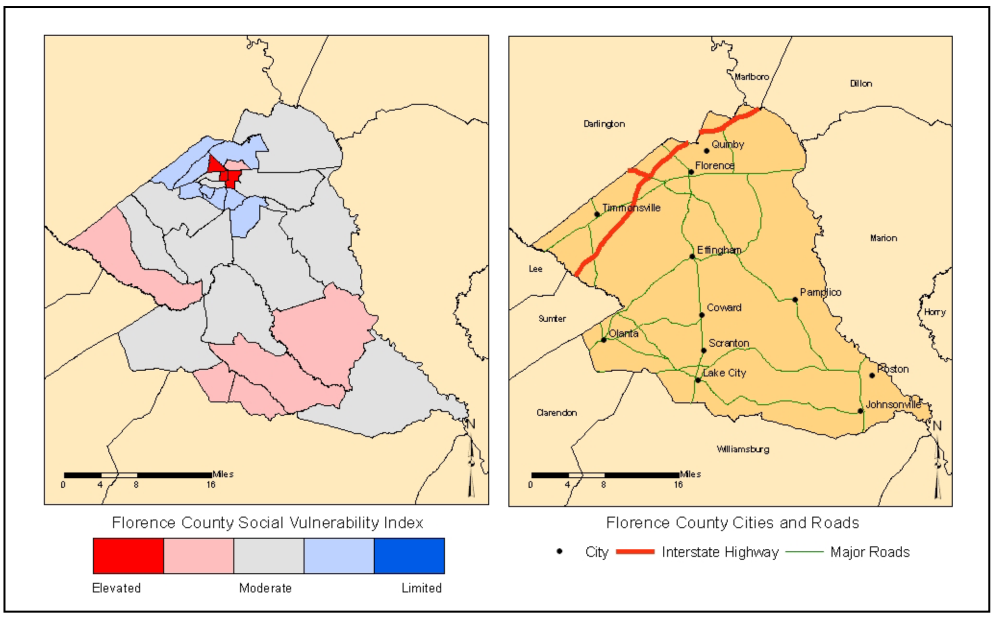


FIGURE 1. The Social Vulnerability for Florence County, SC by US Census tracts.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.

Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.

Hazard – the potential threat to humans as well as the impact of an event on society and the environment.

Recurrence – a calculated number that examines the expected time interval between events based on the historic record.

Risk – the likelihood or probability of occurrence of a hazard or adverse event.

Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element in distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents based on event frequency. The most common hazards in Florence County are hazardous material accidents, severe thunderstorm and wind, hail, and wildfires. Earthquakes, hurricanes/tropical storms, and temperature extremes are among the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in table 1.

TABLE 1. The Hazard Profile for Florence County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	8	158	19.75	5.06
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	9	59	6.56	15.25
Flood	13	59	4.54	22.03
Fog	1	12	12.00	8.33
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	1	310	310.00	0.32
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	183	22	<0.50	831.82**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	35,885	10	<0.50	358,850.00**
Severe Thunderstorm Events				
Funnel Cloud	1	16	16.00	6.25
Hail	102	59	0.58	172.88**
Heavy Precipitation	6	15	2.50	40.00
Lightning	16	16	1.00	100.00
Thunderstorm & Wind	156	59	<0.50	264.41**
Tornado	31	59	1.90	52.54
Temperature Extremes	1	16	16.00	6.25
Wildfire	4,131	21	<0.50	19,671.43**
Winter Weather (Snow & Ice)	9	59	6.56	15.25

[a] Data Sources: National Climatic Data Center (**www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm**); National Geophysical Data Center (**www.ngdc.noaa.gov/hazard/**
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Florence County has a higher probability of loss-producing fog, hail, hurricane/tropical storm, lightning, and tornado events. It has roughly has the state average for heat and wind events. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Thunderstorms and winter weather are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

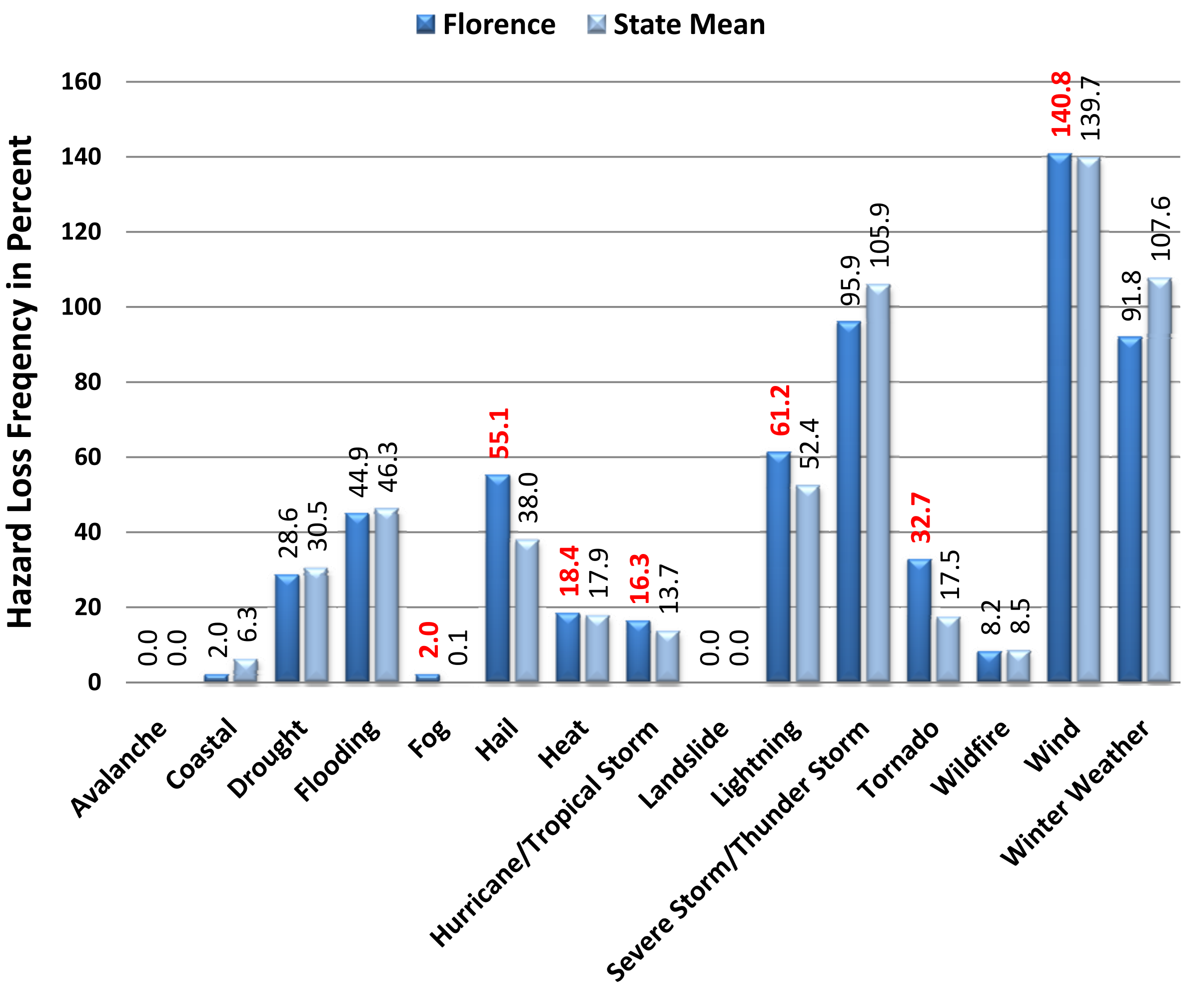


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Florence County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Florence County exceed $273 million, and are largely due to hurricanes and tropical storms. Hurricane/tropical storm represented 64% of the damage in Florence County. While significant for the county, these cumulative losses represent 2.9% of the state's total overall. The county contains 13% of the state's hail damage, and 59% of the losses due to fog.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,055,942	2.17%
Flooding	$4,190,964	2.71%
Fog	$23,908	59.13%
Hail	$13,744,080	13.33%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$174,101,543	3.16%
Lightning	$2,365,276	4.50%
Severe Storm/ Thunder Storm	$17,027,047	8.06%
Tornado	$3,622,286	1.53%
Wildfire	$334,042	2.09%
Wind	$14,950,380	10.26%
Winter Weather	$18,242,463	2.02%
Florence - Total	**$273,951,050**	**2.86%**

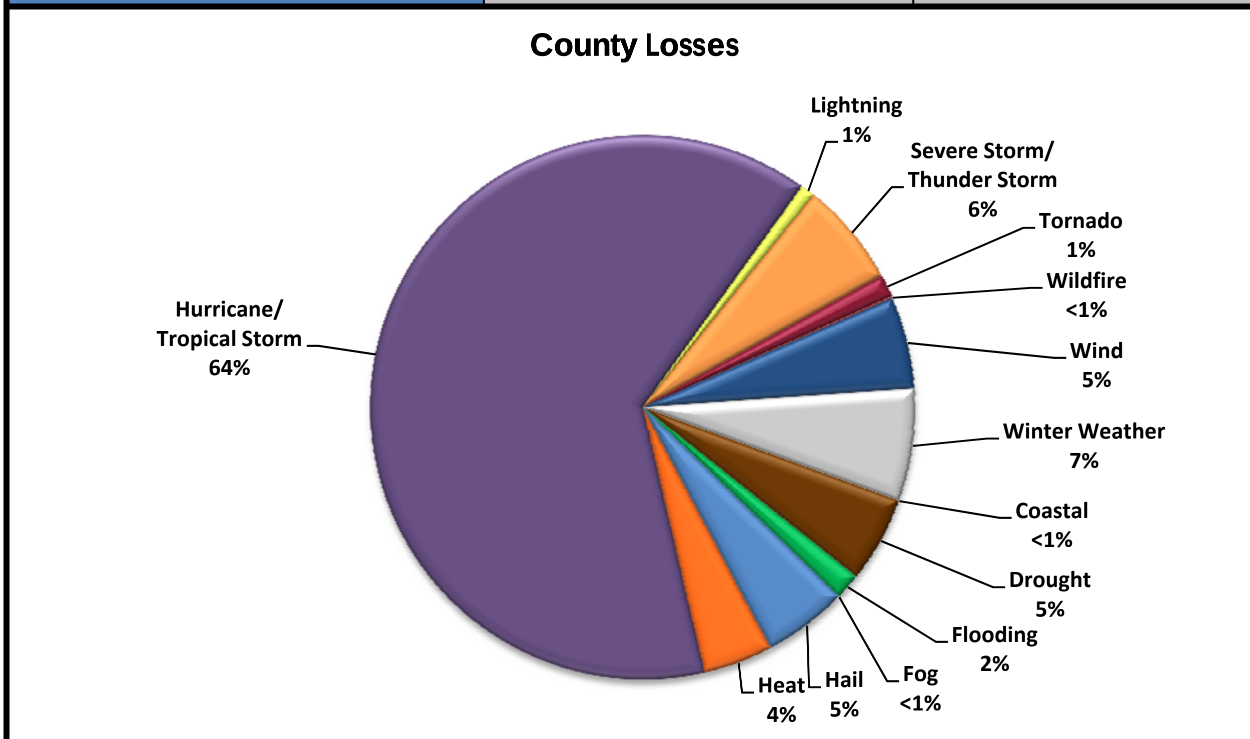
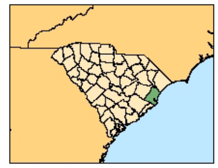


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Florence County, SC.

GEORGETOWN COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Georgetown County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents). Hurricane/tropical storms produce the highest monetary damages; however, the recurrence interval is 9.3 years, making it a relatively infrequent event. Winter weather, another infrequent event also is quite costly, as our drought and heat events. Coastal storms, hazardous material incidents, thunderstorms, and wildfires are some of the prominent hazards that regularly affect the county based on past occurrences, but result in few reported losses.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Georgetown County, most of the census tracts exhibit moderate to moderately elevated levels of social vulnerability, based on statewide comparisons. Limited SoVI scores are along the coast in the northern portion of the county. Figure 1 provides maps of the Georgetown County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

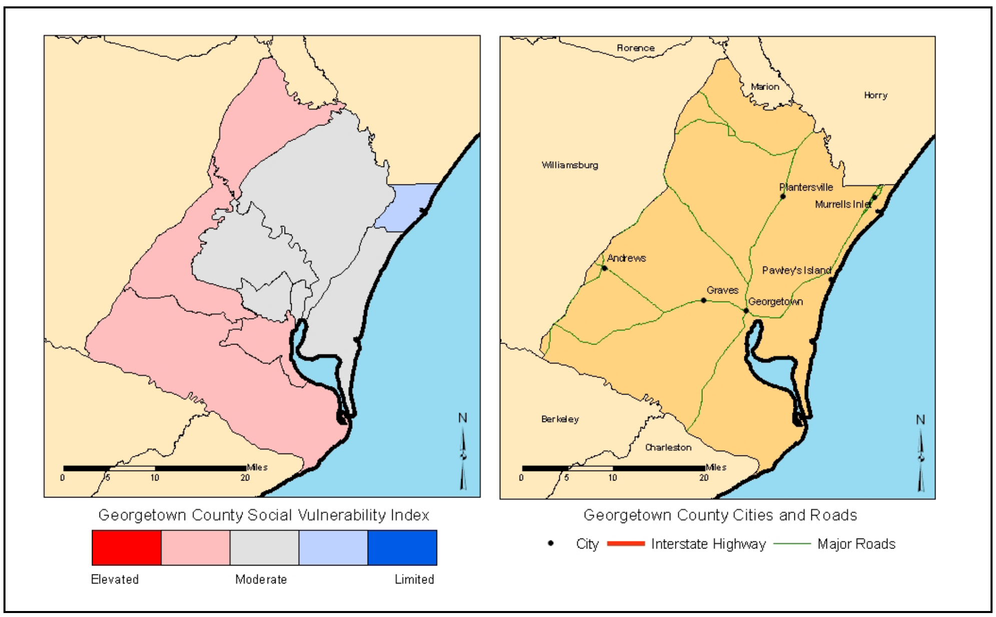


FIGURE 1. The Social Vulnerability for Georgetown County, SC by US Census tracts and a general reference map of Georgetown County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Georgetown County are hazardous material accidents, and severe thunderstorms. Floods, tornadoes, and hurricanes occur on average every 3, 4, and 9 years respectively. Earthquakes and winter weather have the lowest recurrence interval include. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Georgetown County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	17	158	9.29	10.76
Ocean & Lake Surf[b]	7	16	2.29	43.75
Waterspout	6	16	2.67	37.50
Dam Failure	-	-	-	-
Drought	7	59	8.43	11.86
Flood	17	59	3.47	28.81
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	2	310	155.00	0.65
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	341	22	<0.50	1,550.00**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	11,111	10	<0.50	111,110.00**
Severe Thunderstorm Events				
Funnel Cloud	2	16	8.00	12.50
Hail	49	59	1.20	83.05
Heavy Precipitation	19	15	0.79	126.67**
Lightning	17	16	0.94	106.25**
Thunderstorm & Wind	88	59	0.67	149.15**
Tornado	13	59	4.54	22.03
Temperature Extremes	1	16	16.00	6.25
Wildfire	2,420	21	<0.50	11,523.81**
Winter Weather (Snow & Ice)	3	59	19.67	5.08

[a] Data Sources: National Climatic Data Center (**www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm**); National Geophysical Data Center (**www.ngdc.noaa.gov/hazard/**

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Georgetown County has a higher probability of coastal hazards, flooding, hurricanes, tornadoes, lightning, and drought. Figure 2 (page 3) shows those loss causing hazards occurring in the county that exceeded the state mean in red font. Winter weather, wind, and thunderstorms are well below the state mean indicating that these hazards historically have had less impact on Georgetown County than elsewhere in South Carolina.

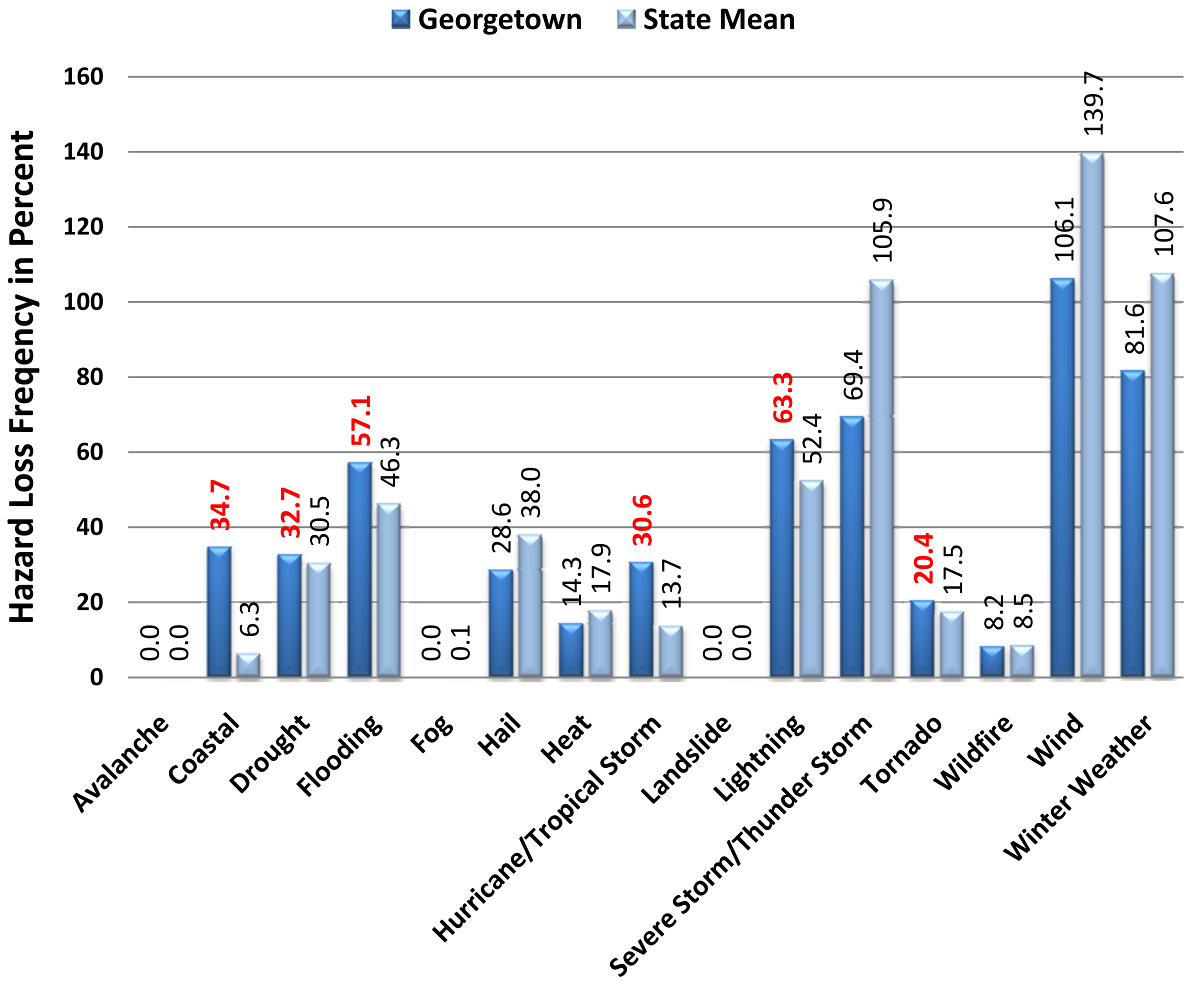


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Georgetown County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Georgetown County exceed $1billion, and were largely due to hurricanes and tropical storms, followed by coastal, winter weather, and drought, Hurricane/tropical storm represented 87% of the damage in Georgetown County. While significant for the county, these cumulative losses represent 12% of the state's total overall, but 18% of the state's total damages related to hurricane/tropical storms.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$88,380,683	8.57%
Drought	$14,201,478	2.28%
Flooding	$3,088,883	2.07%
Hail	$314,391	0.32%
Heat	$11,286,643	2.26%
Hurricane/ Tropical Storm	$958,776,895	18.10%
Lightning	$980,833	1.94%
Severe Storm/ Thunder Storm	$2,895,861	1.43%
Tornado	$2,676,242	1.17%
Wildfire	$334,042	2.18%
Wind	$3,256,095	2.32%
Winter Weather	$16,769,438	1.94%
Georgetown - Total	**$1,102,961,484**	**11.99%**

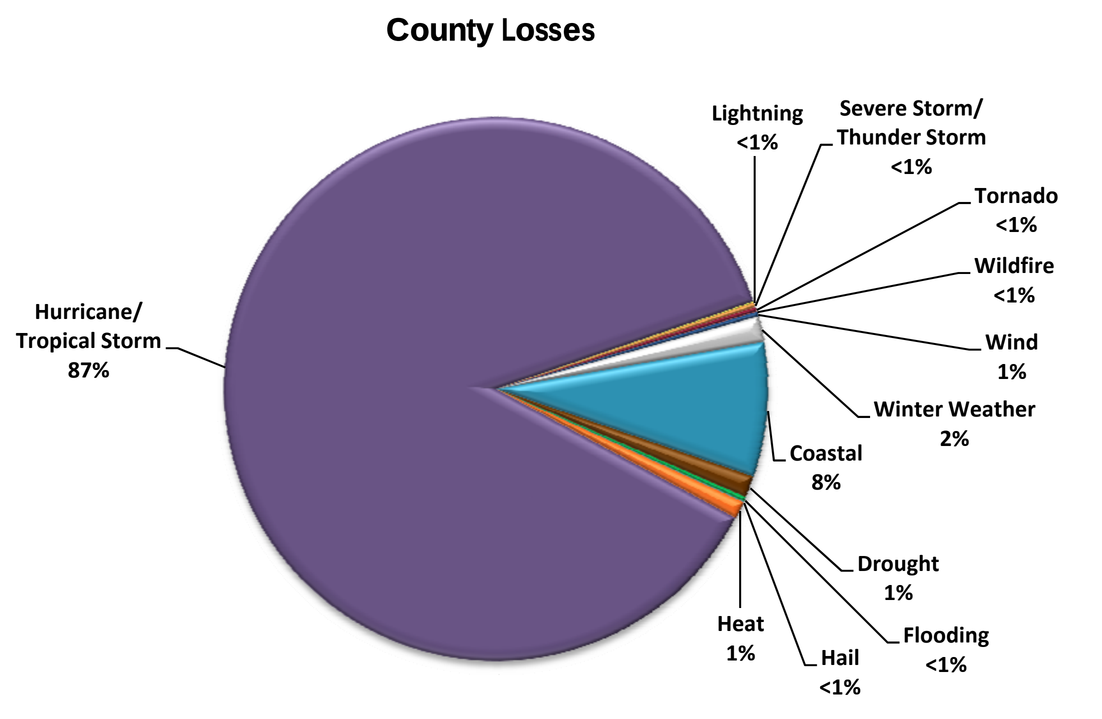
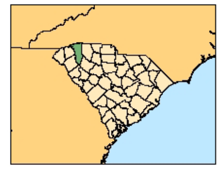


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Georgetown County, SC.

GREENVILLE COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Greenville County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents). Winter weather and flooding produce the highest monetary damages and occur at least once per year. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences. Less frequent events include hurricanes and earthquakes.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Greenville County, most of the census tracts exhibit moderate to low levels of social vulnerability. However, there is a concentration of elevated vulnerability in Census tracts in the cities of Greenville, Greer, and Simpsonville with elevated SoVI scores. Figure 1 provides maps of the Greenville County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

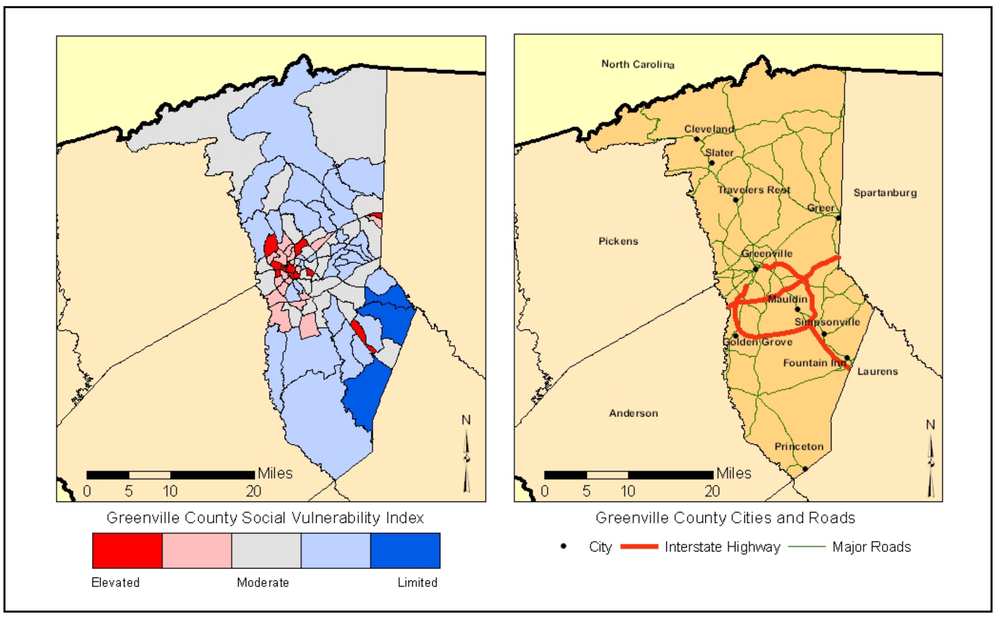


FIGURE 1. The Social Vulnerability for Greenville County, SC by US Census tracts and a general reference map of Greenville County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Greenville County are hazardous material accidents, severe thunderstorms and wind, wildfires, winter weather, and flooding. Hurricanes/tropical storms and earthquakes are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Greenville County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	2	158	79.00	1.27
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	34	59	1.74	57.63
Flood	89	59	0.664	150.85**
Fog	6	12	2.00	50.00
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	7	310	44.29	2.26
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	489	22	<0.50	2,222.73**
Nuclear Power Plant	0	8	*	*
Terrorism	1	29	29.00	3.45
Transportation (Motor Vehicle)	101,383	10	<0.50	1,013,830.00**
Severe Thunderstorm Events				
Funnel Cloud	3	16	5.33	18.75
Hail	210	59	<0.50	355.93**
Heavy Precipitation	12	15	1.25	80.00
Lightning	17	16	0.94	106.25**
Thunderstorm & Wind	349	59	<0.50	591.53**
Tornado	22	59	2.68	37.29
Temperature Extremes	9	16	1.78	56.25
Wildfire	1,056	21	<0.50	5,028.57**
Winter Weather (Snow & Ice)	74	59	0.80	125.42**

[a] Data Sources: National Climatic Data Center (**www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm**); National Geophysical Data Center (**www.ngdc.noaa.gov/hazard/**

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)

** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year

\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Greenville County has a higher probability of loss-producing drought, flood, hail, heat, lightning, thunderstorm, tornado, wind, and winter weather events. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Hurricanes/tropical storms are below the state mean indicating that fewer of these loss causing hazards have historically occurred in Greenville County when compared to the state as a whole.

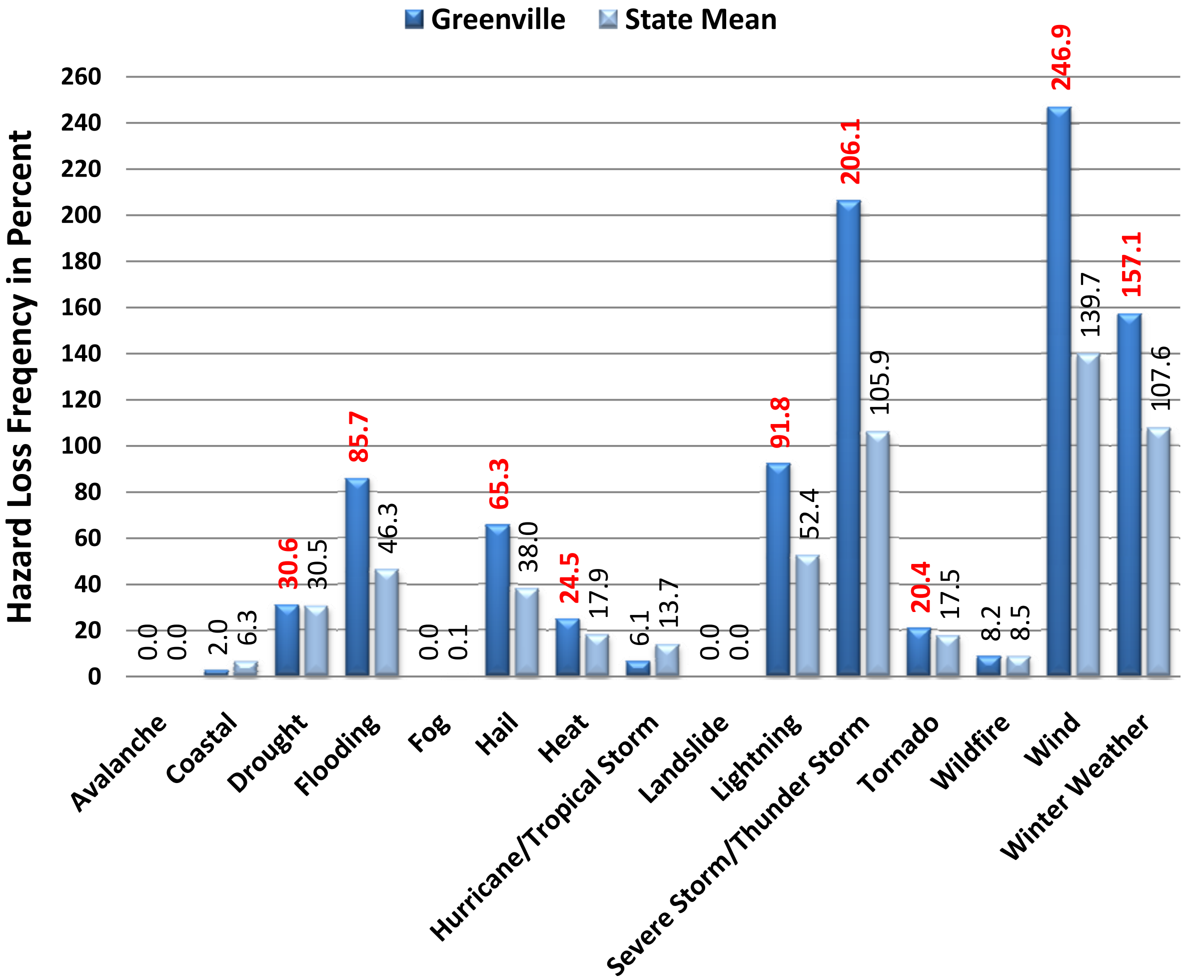


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Greenville County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Greenville County are nearly $1billion and are largely due to winter weather, flooding, drought, and heat. While significant for the county, these cumulative losses represent less than one percent of the state's total overall, but 12.6% of the state's total damages related to flooding, indicating that this hazard presents a major threat the lives and property within the county.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$19,459,982	12.57%
Hail	$1,197,742	1.16%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$329,868	0.01%
Lightning	$3,374,961	6.42%
Severe Storm/ Thunder Storm	$5,945,818	2.81%
Tornado	$3,703,364	1.57%
Wildfire	$334,042	2.09%
Wind	$3,102,308	2.13%
Winter Weather	$32,039,019	3.56%
Greenville - Total	**$94,858,702**	**0.99%**

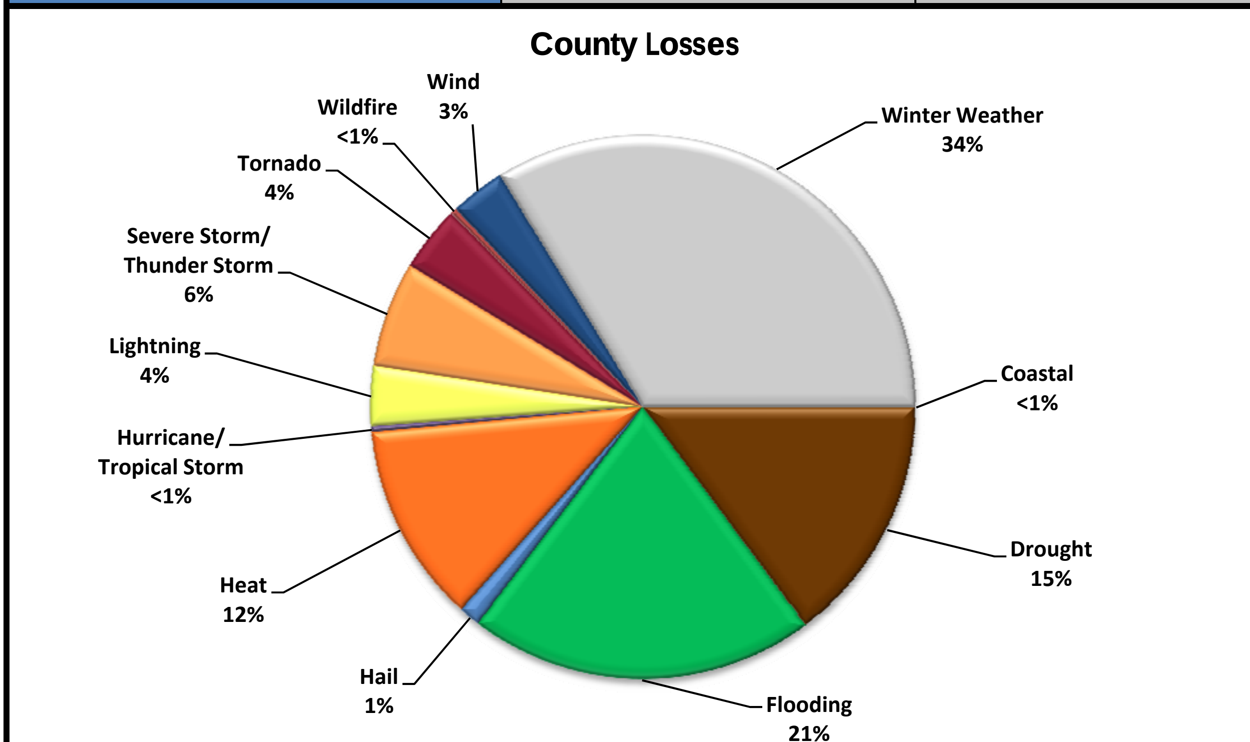
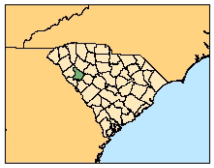


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Greenville County, SC.

GREENWOOD COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Greenwood County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Winter weather produces the highest monetary damage and with a recurrence interval of 2.7 years, is a frequent loss-producing hazard. Wildfires, thunderstorms, hail, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences. Earthquakes and hurricanes/tropical storms are infrequent events in this county.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Greenwood County, most of the census tracts are in the moderate to moderately low levels of social vulnerability. One census tract in Greenwood city exhibits the highest SoVI scores. Figure 1 provides maps of the Greenwood County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

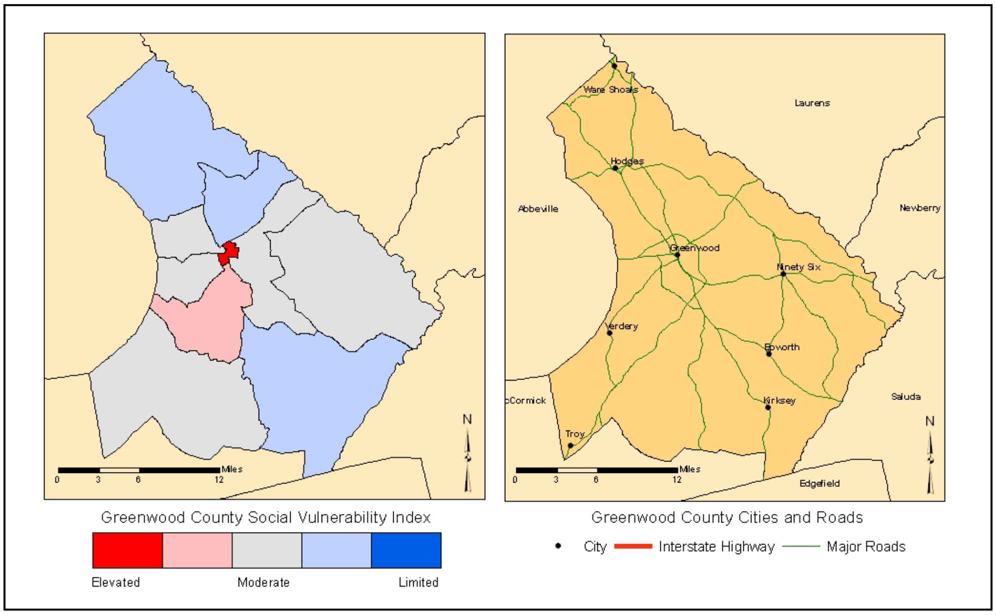


FIGURE 1. The Social Vulnerability for Greenwood County, SC by US Census tracts and a general reference map of Greenwood County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
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Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Greenwood County are hazardous material accidents, severe thunderstorms and wind, hail, and wildfires. Hurricanes/tropical storms and earthquakes are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Greenwood County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	4	158	39.50	2.53
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	33	59	1.79	55.93
Flood	17	59	3.47	28.81
Fog	4	12	3.00	33.33
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	3	310	103.33	0.97
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	103	22	<0.50	468.18**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	14,289	10	<0.50	142,890**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	79	59	0.75	133.90**
Heavy Precipitation	2	15	7.50	13.33
Lightning	10	16	1.60	62.50
Thunderstorm & Wind	155	59	<0.50	262.71**
Tornado	14	59	4.21	23.73
Temperature Extremes	5	16	3.20	31.25
Wildfire	1,350	21	<0.50	6,428.57**
Winter Weather (Snow & Ice)	22	59	2.68	37.29

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Greenwood County has a higher probability of loss-producing winter weather, and tornado events, and is slightly above the state average for drought and heat. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Thunderstorms, wind, lightning, and flooding are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

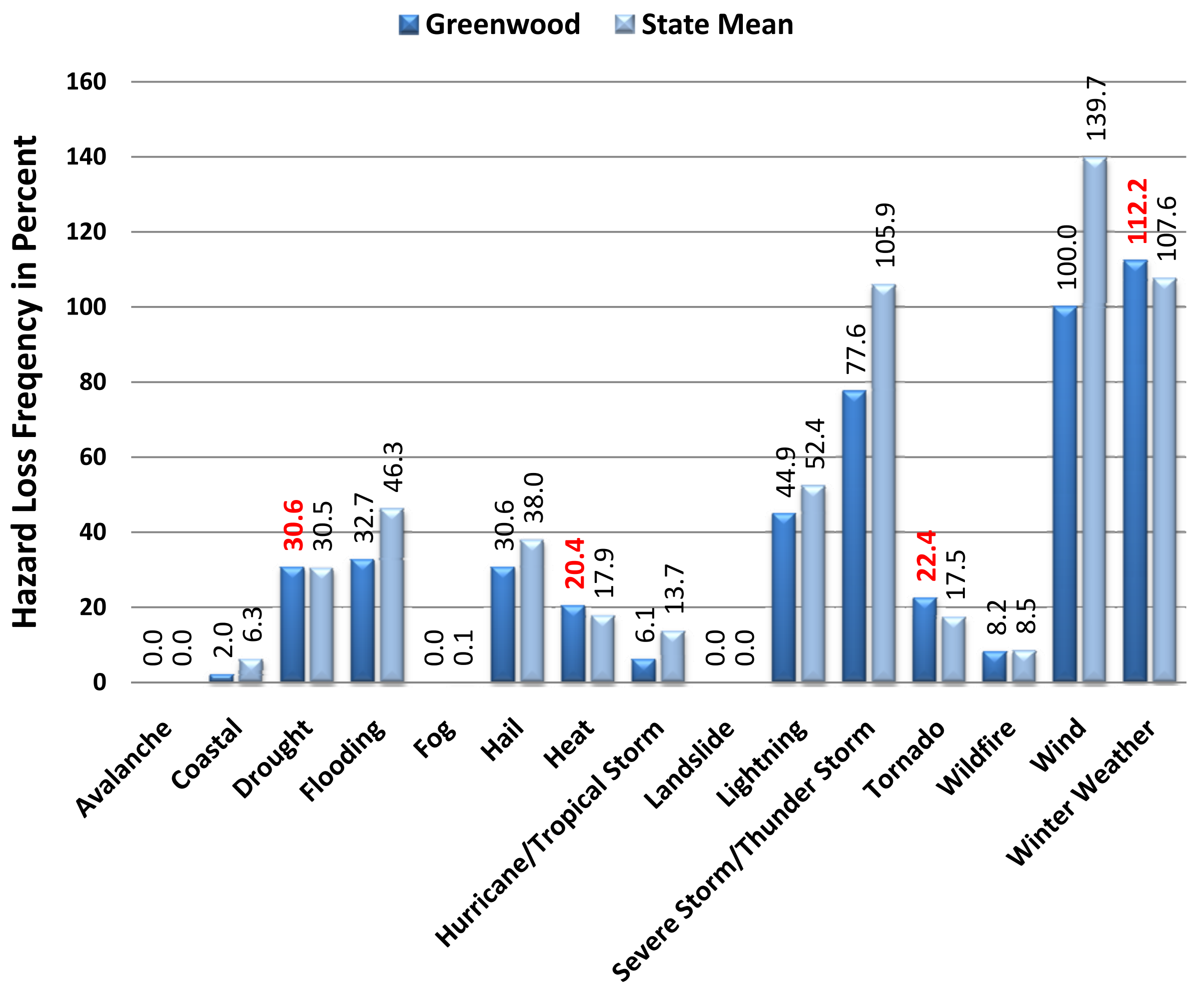


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Greenwood County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Greenwood County exceed $61 million and are largely due to a combination of winter weather, drought, heat, and tornadoes. While significant for the county, these cumulative losses represent less than one percent of the state's total overall, but 3% of the state's total damages related to hail and 3% of the state's total related to tornadoes.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$2,498,545	1.61%
Hail	$3,486,718	3.38%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$329,868	0.01%
Lightning	$337,106	0.64%
Severe Storm/ Thunder Storm	$849,652	0.40%
Tornado	$7,204,919	3.05%
Wildfire	$334,042	2.09%
Wind	$657,309	0.45%
Winter Weather	$20,230,710	2.25%
Greenwood - Total	**$61,280,467**	**0.64%**

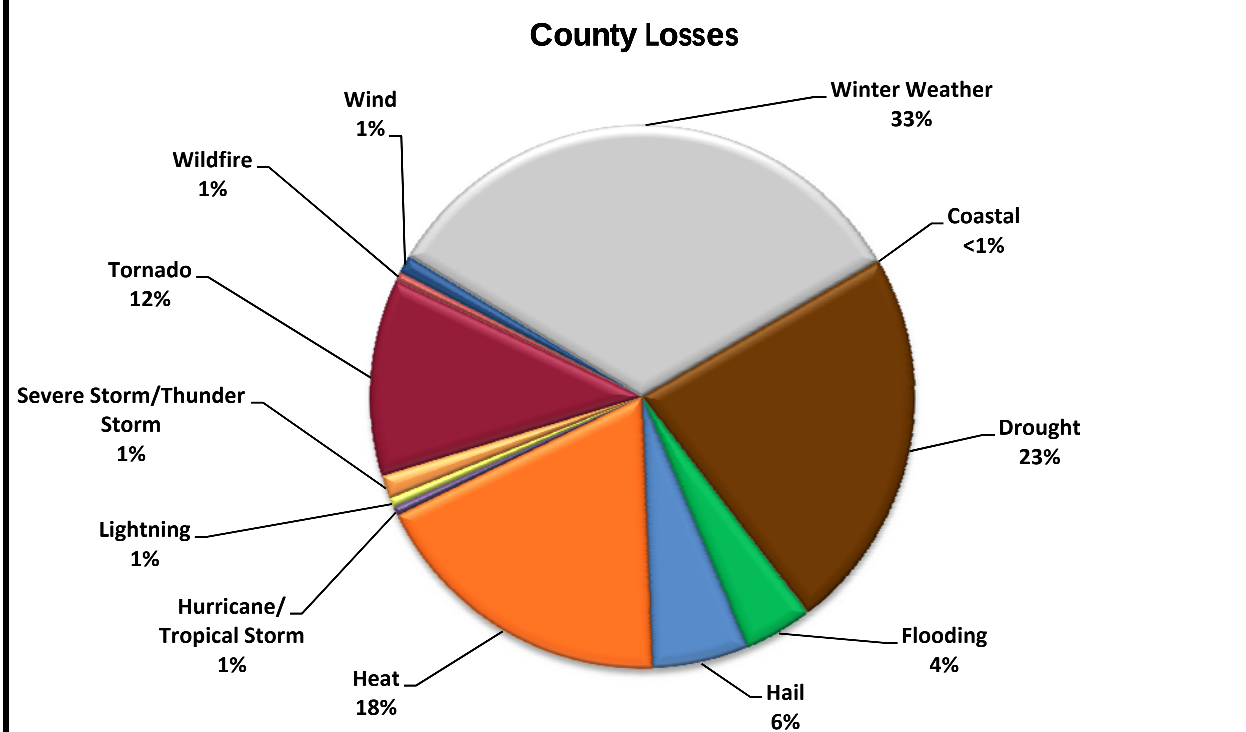
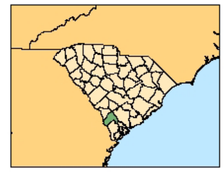


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Greenwood County, SC.

HAMPTON COUNTY, SC



Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008

I. Summary

Hampton County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Winter weather produced the greatest monetary damages; however, the recurrence interval is 29.5 years, making it a relatively rare loss-causing event. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Hampton County, all of the census tracts exhibit moderate to moderately elevated levels of social vulnerability. Figure 1 provides maps of the Hampton County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

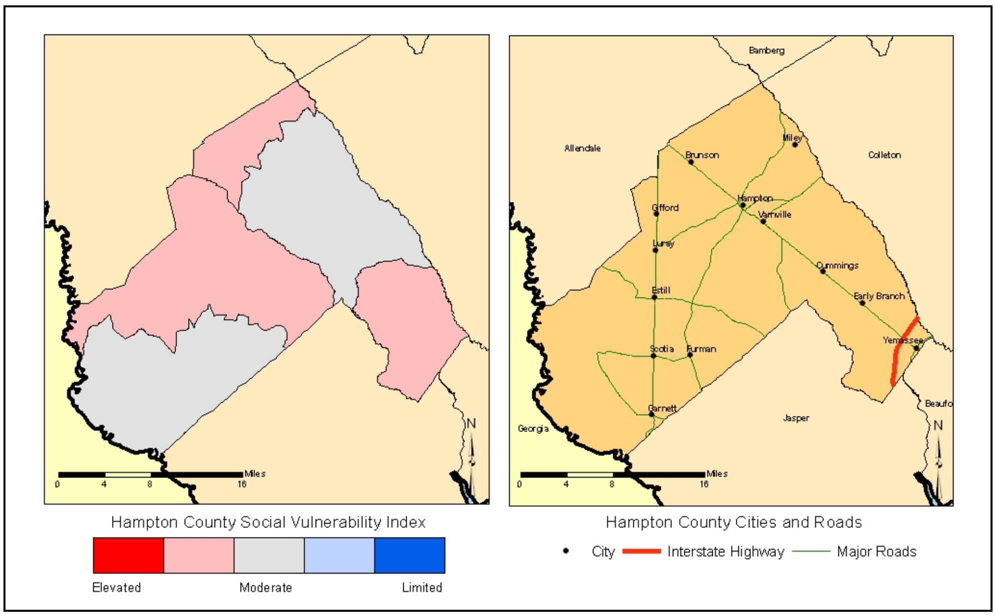


FIGURE 1. The Social Vulnerability for Hampton County, SC by US Census tracts and a general reference map of Hampton County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Hampton County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Flooding, coastal, and winter weather are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Hampton County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	13	158	12.159	8.23
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	21	59	2.81	35.59
Flood	5	59	11.80	8.47
Fog	0	12	*	*
Geophysical Events	0	310	*	*
Avalanche	0	49	*	*
Earthquake	0	310	*	*
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	42	22	0.52	190.91**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	3,150	10	<0.50	31,500.00**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	33	59	1.79	55.93
Heavy Precipitation	0	15	*	*
Lightning	2	16	8.00	12.50
Thunderstorm & Wind	113	59	0.52	191.53**
Tornado	13	59	4.54	22.03
Temperature Extremes	6	16	2.67	37.50
Wildfire	1,751	21	<0.50	8,338.10**
Winter Weather (Snow & Ice)	2	59	29.50	3.39

[a] Data Sources: National Climatic Data Center (**www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm**); National Geophysical Data Center (**www.ngdc.noaa.gov/hazard/**
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Hampton County has a higher probability of loss-producing wind, thunderstorm and heat events. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Winter weather, lightning, and hail are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

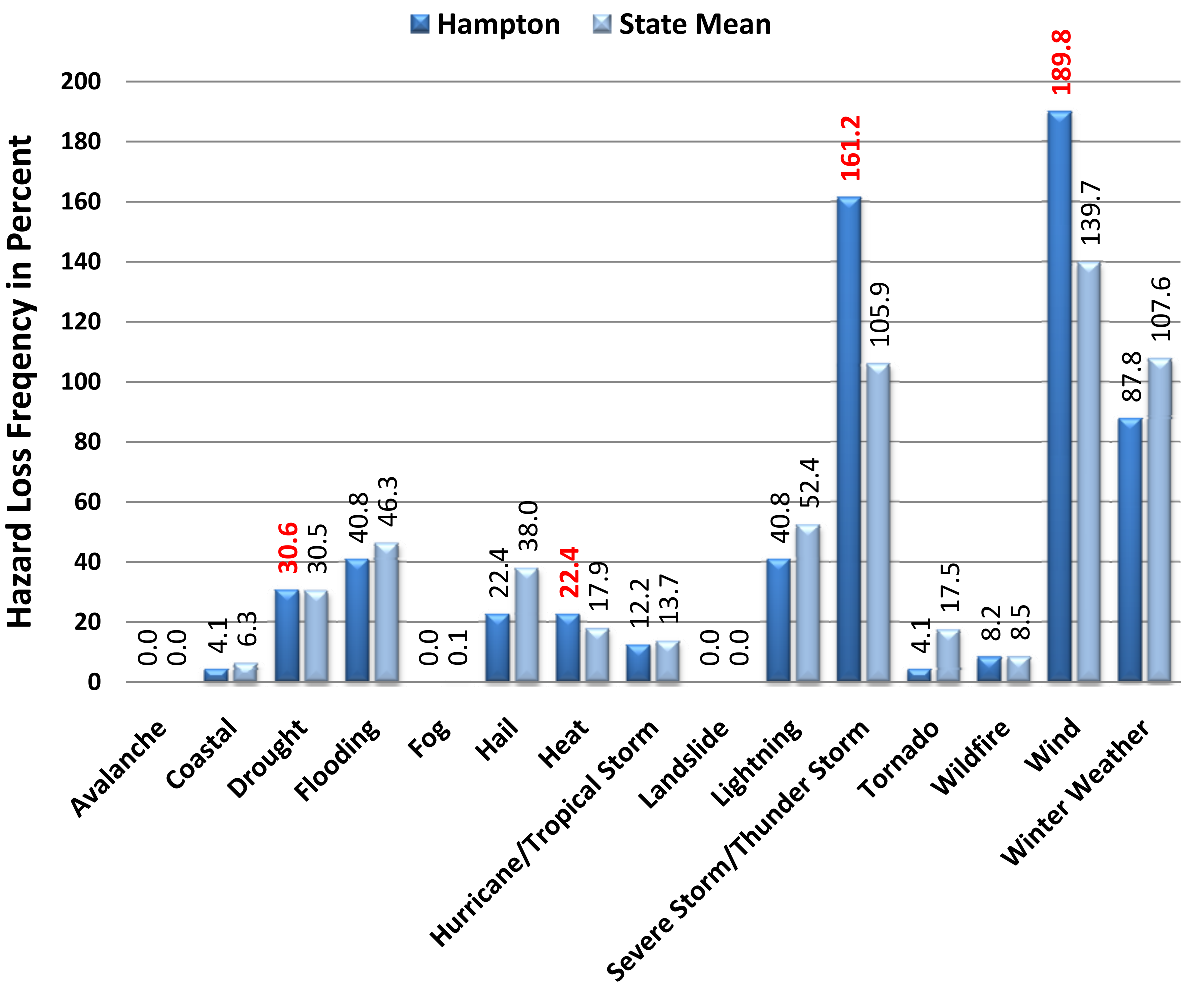


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Hampton County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Hampton County exceed $54 million, and are largely due to winter weather (40%), drought (26%), and heat (21%). While significant for the county, these cumulative losses represent less than one percent of the state's overall total.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$15,143	0.01%
Drought	$14,058,478	2.17%
Flooding	$1,418,445	0.92%
Hail	$107,696	0.10%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$3,744,033	0.07%
Lightning	$559,686	1.07%
Severe Storm/ Thunder Storm	$494,199	0.23%
Tornado	$346,667	0.15%
Wildfire	$334,042	2.09%
Wind	$374,938	0.26%
Winter Weather	$22,222,202	2.47%
Hampton - Total	**$54,962,171**	**0.57%**

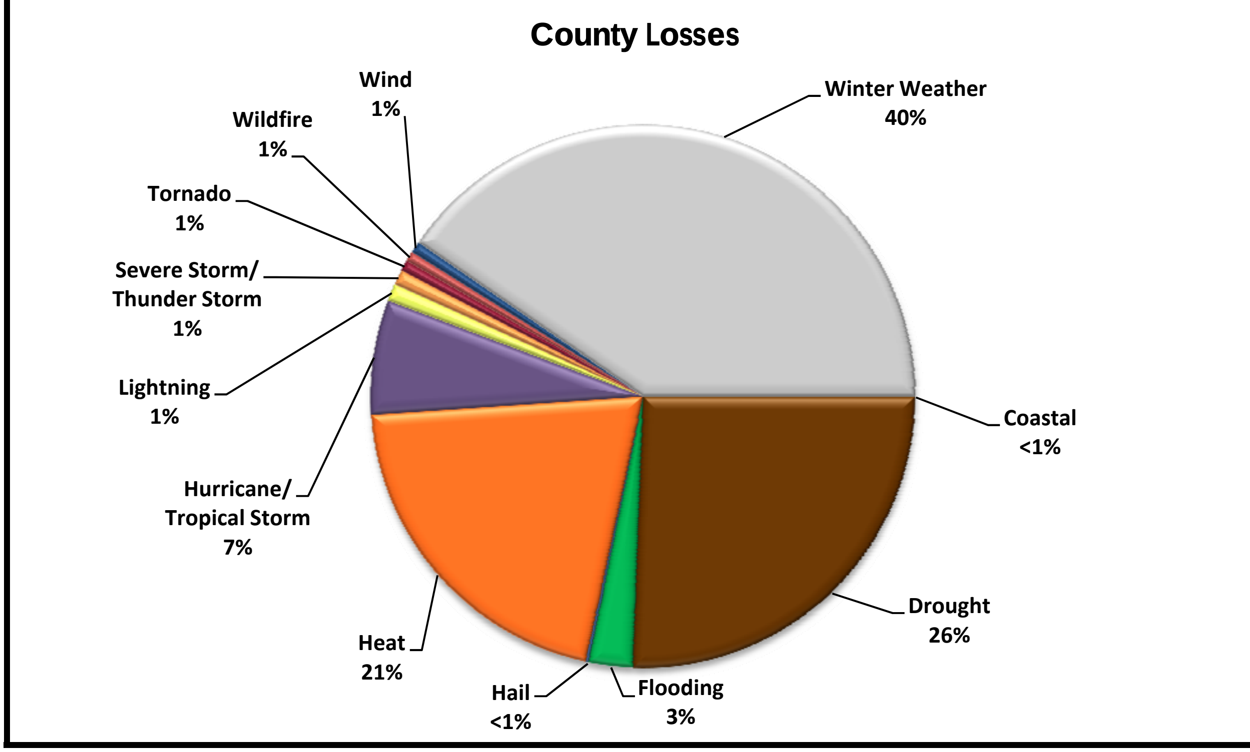
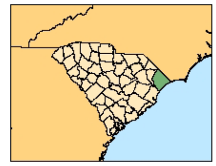


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Hampton County, SC.

HORRY COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Horry County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Hurricane/tropical storms produce the greatest monetary damage; however, the recurrence interval is 8.3 years, making it a relatively rare event. Ocean and lake surf is more common, producing roughly 8% of the county's losses. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Horry County, most of the census tracts exhibit moderate levels of social vulnerability. Census tracts closer to the coast have limited SoVI scores, than those further inland where social vulnerability exhibits moderately elevated to elevated level. Figure 1 provides maps of the Horry County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

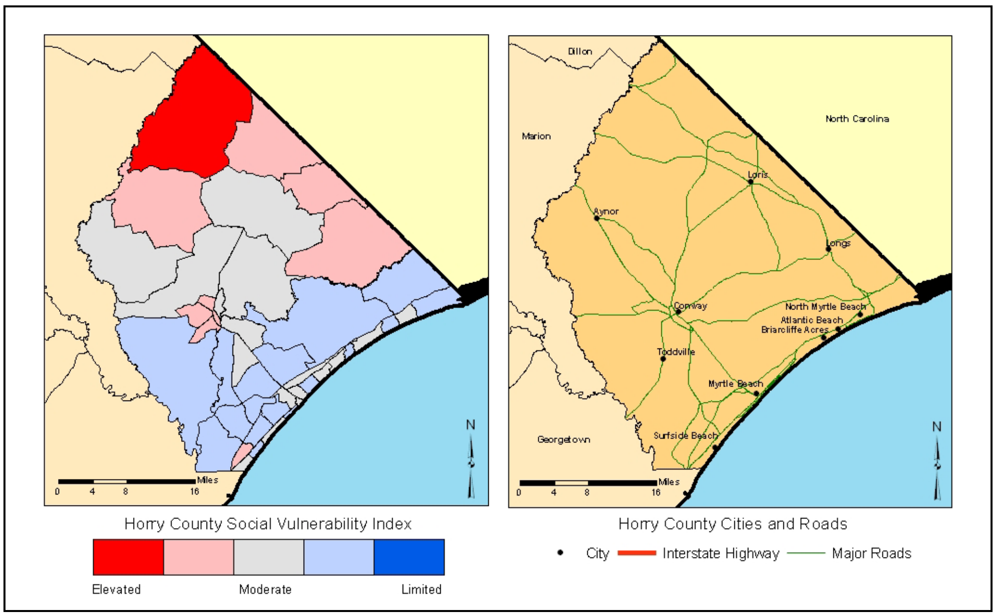


FIGURE 1. The Social Vulnerability for Horry County, SC by US Census tracts and a general reference map of Horry County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Horry County are hazardous material accidents, severe thunderstorms and wind, hail, and wildfires. Winter weather is the hazard with the lowest recurrence interval (14.8 years). The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Horry County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	19	158	8.32	12.03
Ocean & Lake Surf[b]	13	16	1.23	81.25
Waterspout	6	16	2.67	37.50
Dam Failure	-	-	-	-
Drought	7	59	8.43	11.86
Flood	31	59	1.90	52.24
Fog	1	12	12.00	8.33
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	0	310	*	*
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	423	22	<0.50	1,922.73**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	70,843	10	<0.50	708,430.00**
Severe Thunderstorm Events				
Funnel Cloud	3	16	5.33	18.75
Hail	133	59	<0.50	225.42**
Heavy Precipitation	9	15	1.67	60.00
Lightning	26	16	0.62	162.00**
Thunderstorm & Wind	194	59	<0.50	328.81**
Tornado	37	59	1.59	62.71
Temperature Extremes	4	16	4.00	25.00
Wildfire	3,604	21	<0.50	17,161.00**
Winter Weather (Snow & Ice)	4	59	14.75	6.78

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Horry County has a higher probability of loss-producing events from all the hazards except avalanches, landslides, wildfires, and winter weather. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Winter weather is well below the state mean indicating that this hazard has historically produced fewer losses for the county when compared to the state as a whole.

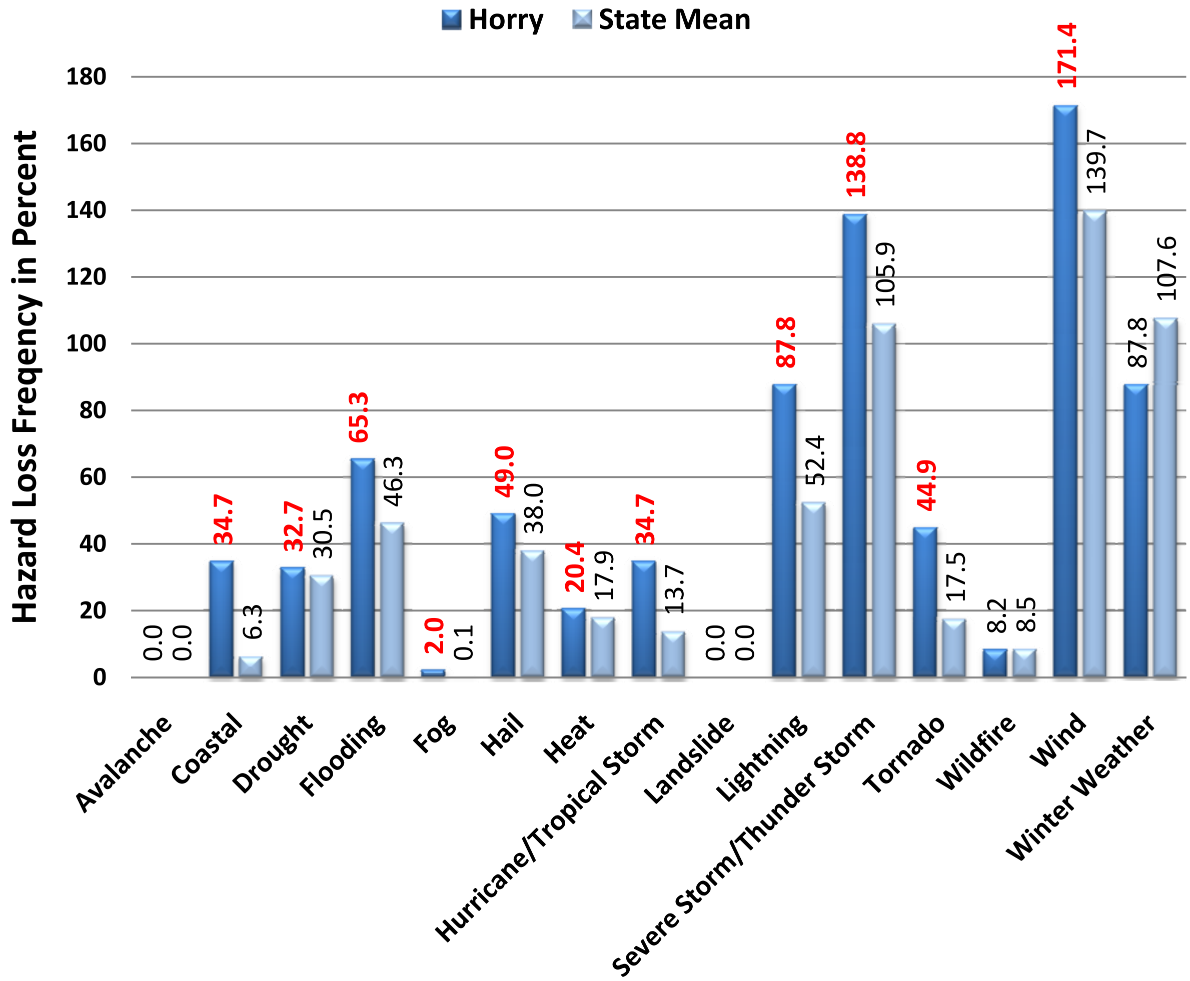


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Horry County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Horry County exceed $1billion, and are largely due to hurricanes and tropical storms, followed by coastal events. Hurricane/tropical storm represented 83% of the damage in Horry County. While significant for the county, these cumulative losses represent 11% of the state's total overall, but 16.6% of the state's total damages related to hurricane/tropical storms. Losses from tornadoes represent 8% of the state's total, and fog represents 45% of the state total.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$88,372,883	8.24%
Drought	$14,201,478	2.19%
Flooding	$13,665,805	8.83%
Fog	$18,140	44.87%
Hail	$1,512,855	1.47%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$912,405,924	16.56%
Lightning	$1,091,341	2.08%
Severe Storm/ Thunder Storm	$7,650,377	3.62%
Tornado	$19,320,697	8.17%
Wildfire	$334,042	2.09%
Wind	$5,176,044	3.55%
Winter Weather	$20,490,554	2.27%
Horry - Total	**$1,095,526,784**	**11.45%**

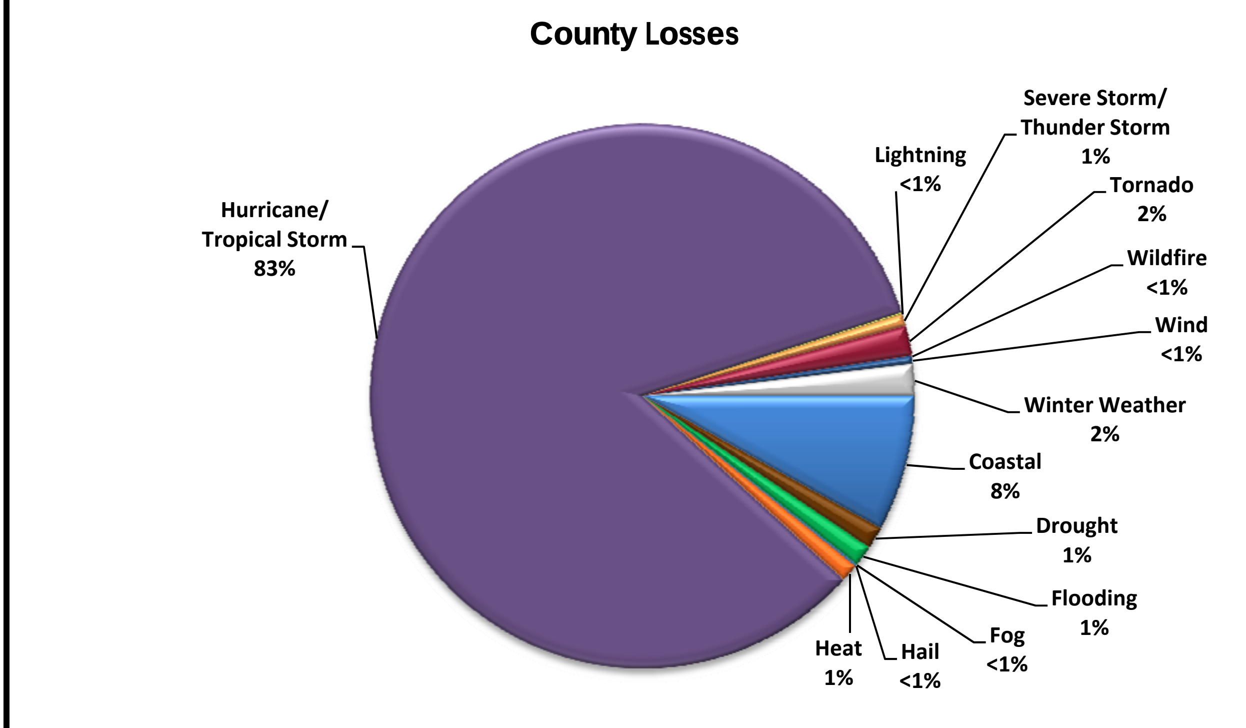
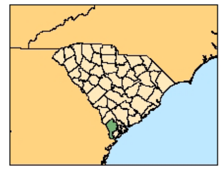


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Horry County, SC.

JASPER COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Jasper County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Drought produced the greatest monetary damage; however, the recurrence interval is 2.8 years, making it a relatively common event when compared to flooding. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Jasper County, most of the census tracts exhibit moderate levels of social vulnerability. Figure 1 provides social vulnerability by census tract (on the left) and maps of the Jasper County depicting cities and major roads (on the left).

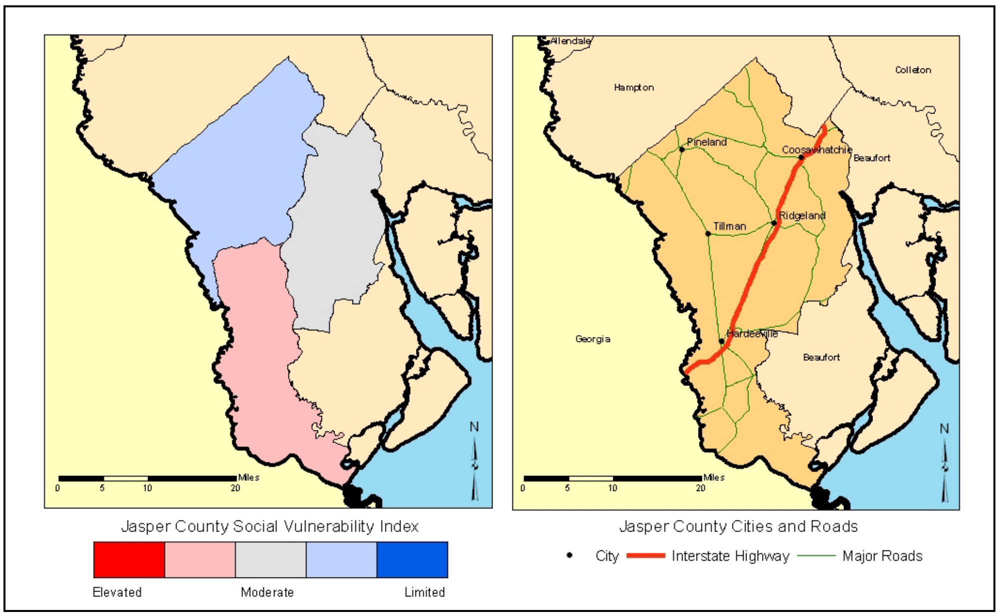


FIGURE 1. The Social Vulnerability for Jasper County, SC by US Census tracts and a general reference map of Jasper County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Jasper County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Winter weather is the hazard with the lowest recurrence interval. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Jasper County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	18	158	8.78	11.39
Ocean & Lake Surf[b]	4	16	4.00	25.00
Waterspout	1	16	16.00	6.25
Dam Failure	-	-	-	-
Drought	21	59	2.81	35.59
Flood	10	59	5.90	16.95
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	0	310	*	*
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	55	22	<0.50	250.00**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	7,999	10	<0.50	79,990.00**
Severe Thunderstorm Events				
Funnel Cloud	2	16	8.00	12.00
Hail	26	59	2.27	44.07
Heavy Precipitation	0	15	*	*
Lightning	0	16	*	*
Thunderstorm & Wind	95	59	0.62	161.02**
Tornado	8	59	7.38	13.56
Temperature Extremes	8	16	2.00	50.00
Wildfire	3,282	21	<0.50	15,628.57**
Winter Weather (Snow & Ice)	1	59	59.00	1.69

[a] Data Sources: National Climatic Data Center (**www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm**); National Geophysical Data Center (**www.ngdc.noaa.gov/hazard/**
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Jasper County has a higher probability of loss-producing coastal, drought flooding, heat, hurricanes/tropical storms, thunderstorms, and wind events. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Winter weather and hail are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

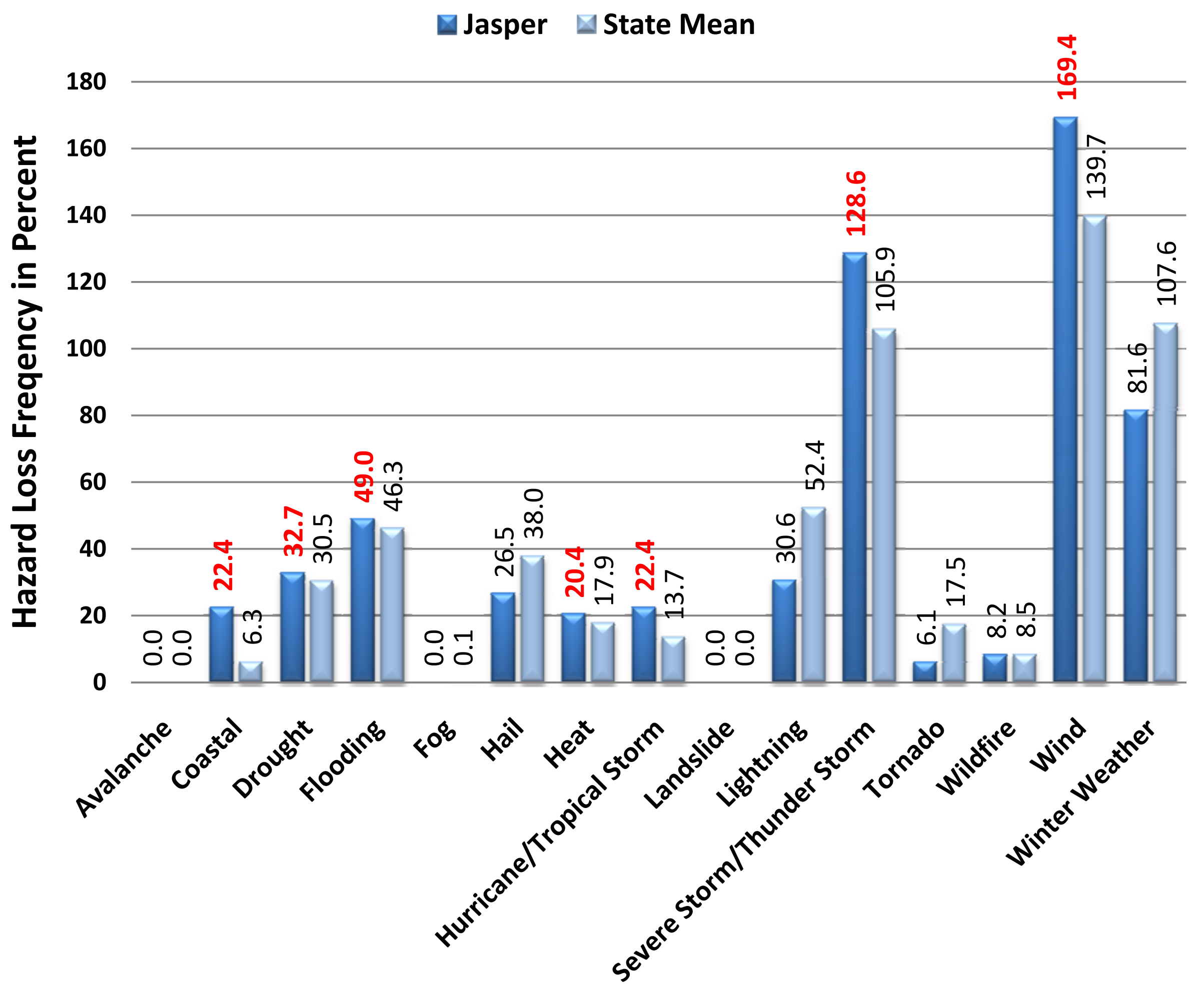


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Jasper County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Jasper County exceed $54 million, and are largely due to a combination of drought, heat, winter weather, among others. While significant for the county, these cumulative losses represent less than one percent of the state's total overall.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$4,978,634	0.46%
Drought	$14,201,478	2.19%
Flooding	$5,577,544	3.60%
Hail	$111,230	0.11%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$4,150,380	0.08%
Lightning	$52,133	0.10%
Severe Storm/ Thunder Storm	$913,653	0.43%
Tornado	$67,014	0.03%
Wildfire	$334,042	2.09%
Wind	$576,806	0.40%
Winter Weather	$12,184,096	1.35%
Jasper - Total	**$54,433,655**	**0.57%**

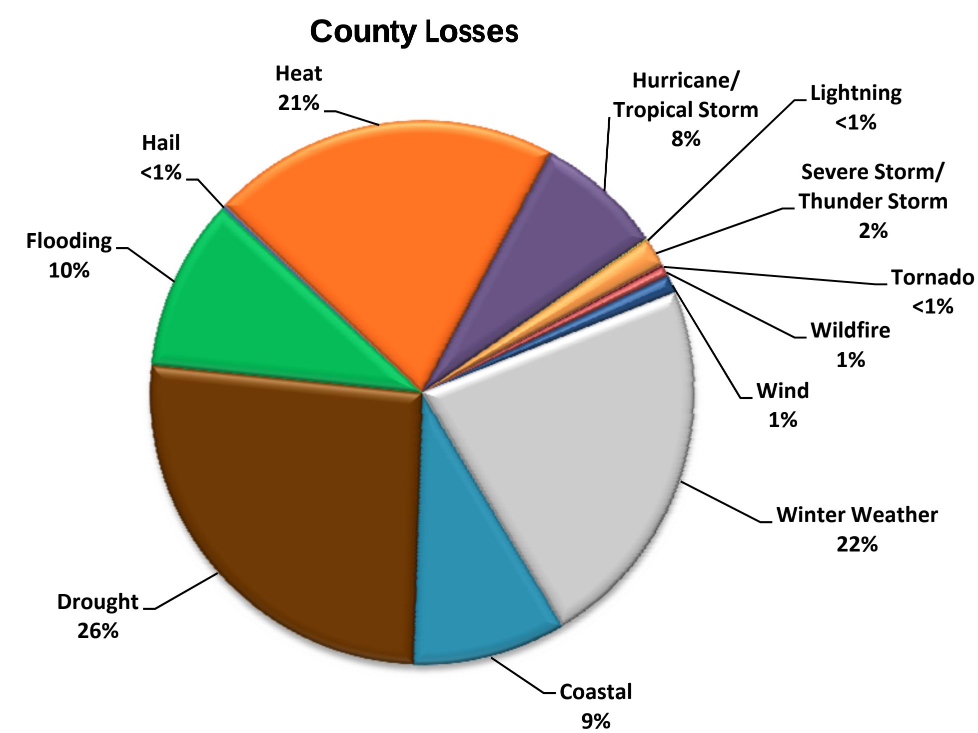
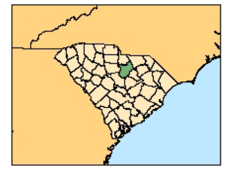


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Jasper County, SC.

KERSHAW COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Kershaw County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Hurricane/tropical storms produce the greatest monetary damage; however, the recurrence interval is 14.4 years, making it a relatively rare event. Wildfires, thunderstorms, hail, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences. County losses from wind, wildfires, and hail represent about 5% each of the state's overall totals for these hazards.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Kershaw County, most of the census tracts exhibit moderate levels of social vulnerability. Census tracts in the Camden and Lugoff show higher SoVI scores illustrating an elevated social vulnerability. Figure 1 provides maps of the Kershaw County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

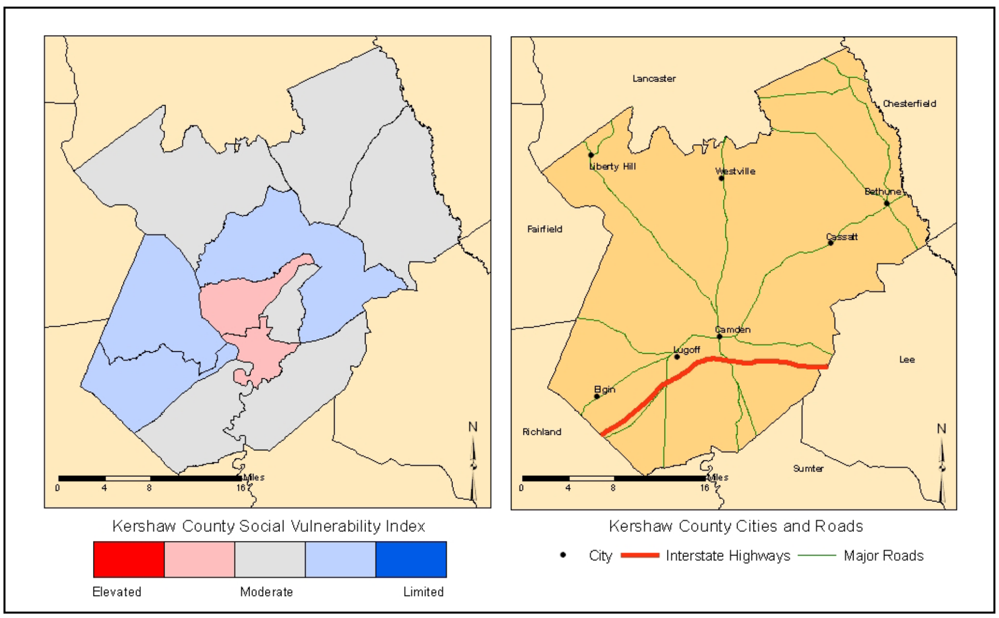


FIGURE 1. The Social Vulnerability for Kershaw County, SC by US Census tracts and a general reference map of Kershaw County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Kershaw County are hazardous material accidents, severe thunderstorms and wind, hail, and wildfires. Earthquakes and drought are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Kershaw County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	10	158	15.80	6.33
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59.00	1.69
Flood	9	59	6.56	15.25
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	3	310	103.33	0.97
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	154	22	<0.50	700.00**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	10,571	10	<0.50	105,710.00**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	75	59	0.79	127.12**
Heavy Precipitation	1	15	15.00	6.67
Lightning	2	16	8.00	12.50
Thunderstorm & Wind	141	59	<0.50	238.98**
Tornado	23	59	2.57	38.98
Temperature Extremes	3	16	5.337	18.75
Wildfire	2,233	21	<0.50	10,633.33**
Winter Weather (Snow & Ice)	11	59	5.36	18.64

[a] Data Sources: National Climatic Data Center (**www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm**); National Geophysical Data Center (**www.ngdc.noaa.gov/hazard/**
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Kershaw County has a higher probability of loss-producing hail, heat, wildfire, and winter weather events. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Thunderstorms and wind events are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

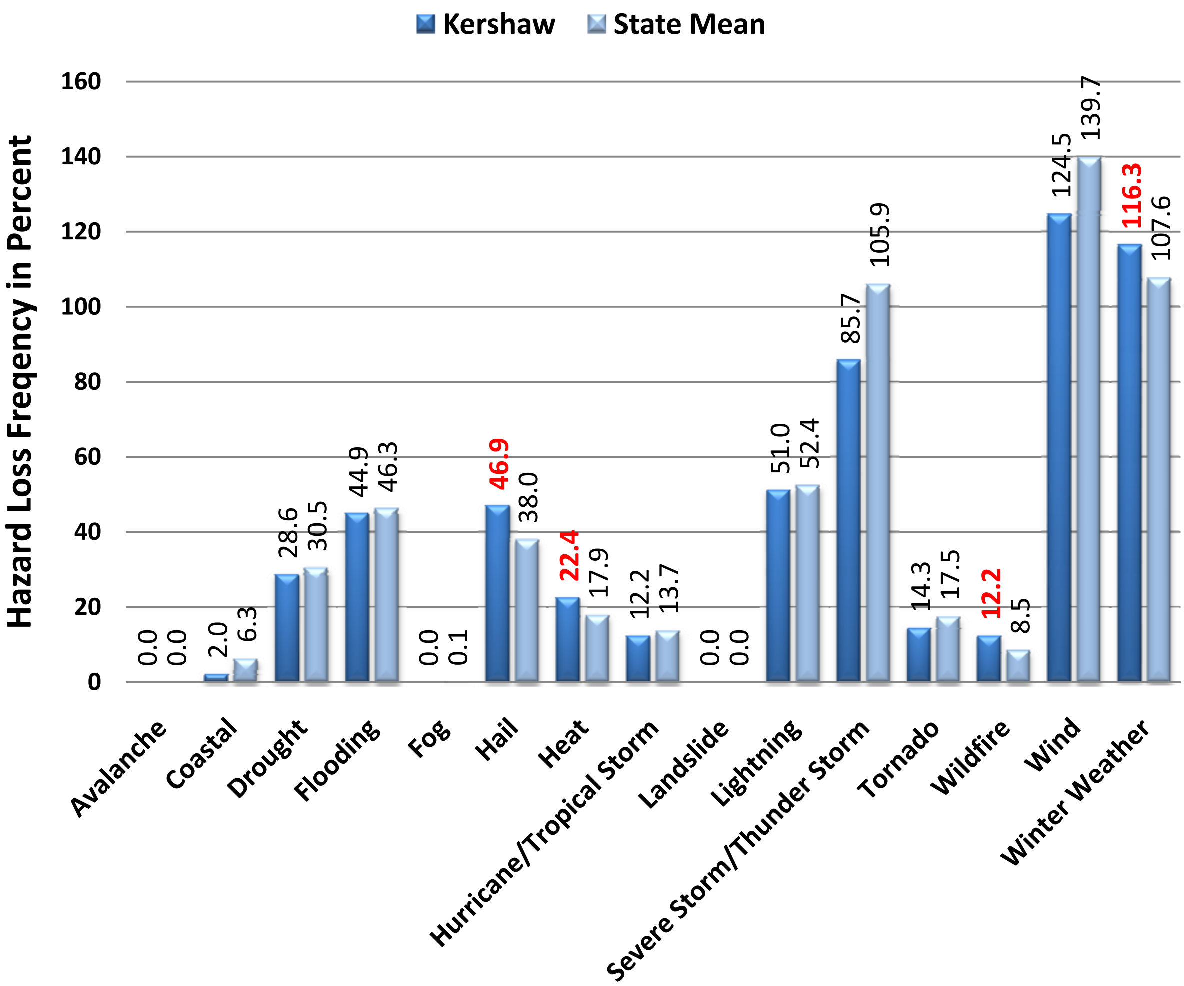


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Kershaw County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Kershaw County exceed $161 million, and are largely due to hurricanes and tropical storms, followed by drought, winter weather, and heat. Hurricane/tropical storm represented 60% of the damage in Kershaw County. While significant for the county, these cumulative losses represent 1.7% of the state's total overall. Kershaw County hail losses account for 6% of the state's total damages from hail related events.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,055,942	2.17%
Flooding	$1,308,580	0.85%
Hail	$6,121,050	5.94%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$96,314,866	1.75%
Lightning	$530,000	1.01%
Severe Storm/ Thunder Storm	$2,257,254	1.07%
Tornado	$5,717,388	2.42%
Wildfire	$852,075	5.34%
Wind	$8,010,212	5.49%
Winter Weather	$14,985,393	1.66%
Kershaw - Total	**$161,445,880**	**1.69%**

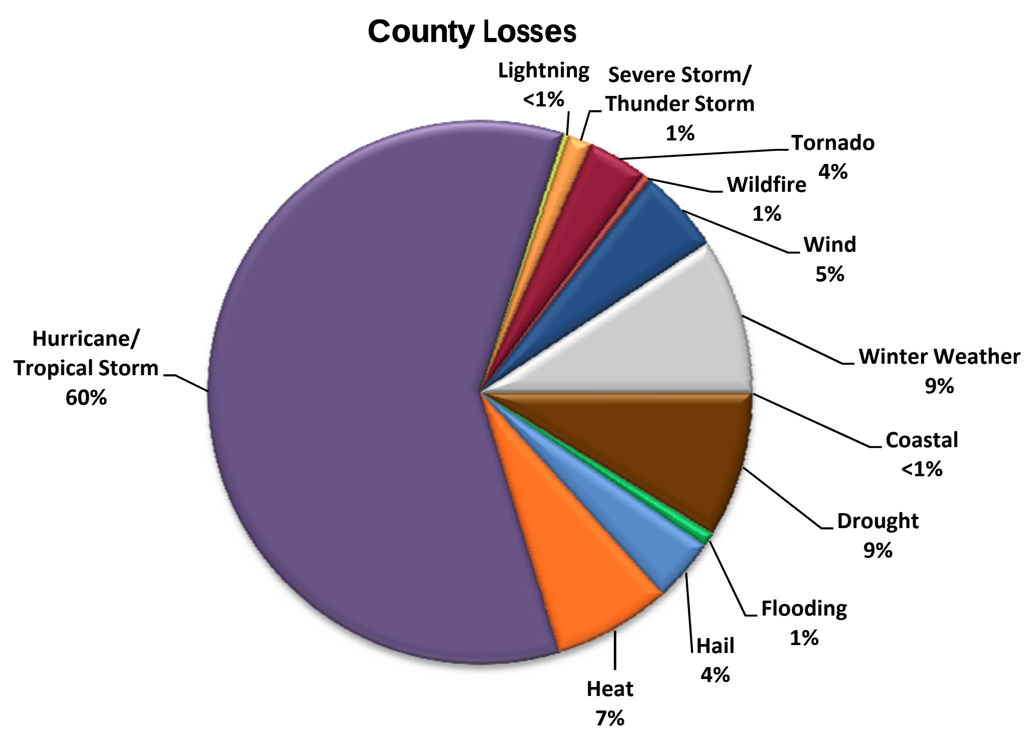
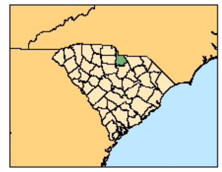


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Kershaw County, SC.

LANCASTER COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Lancaster County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Hurricane/tropical storms produce the greatest monetary damage; however, the recurrence interval is 22.8 years, making it a relatively rare event. Hail, wind, wildfires, and hazardous materials incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Lancaster County, most of the census tracts exhibit moderately low levels of social vulnerability. Census tracts in and around Lancaster city show the highest SoVI scores. Figure 1 provides maps of the Lancaster County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

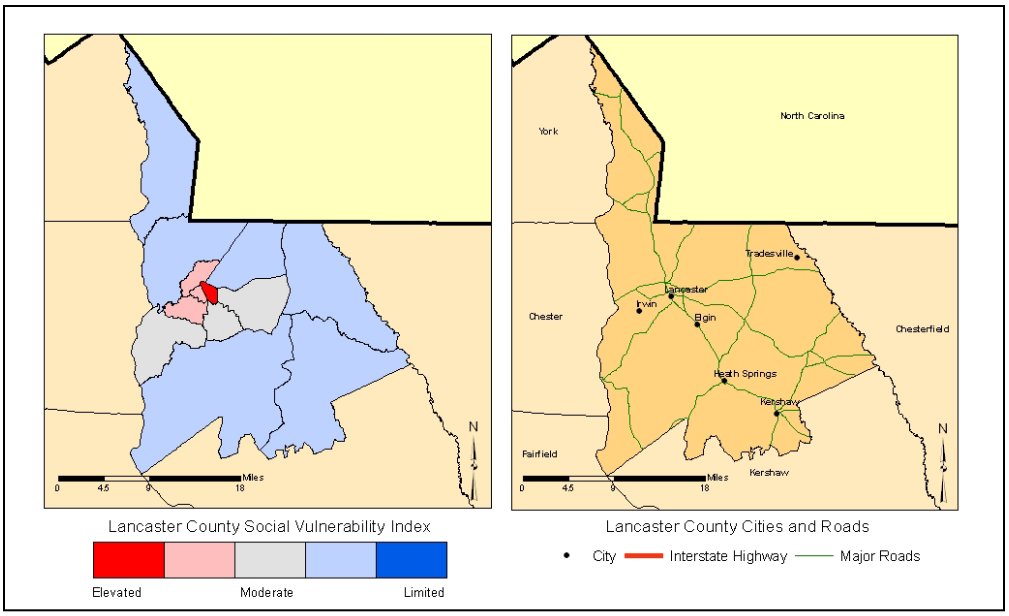


FIGURE 1. The Social Vulnerability for Lancaster County, SC by US Census tracts and a general reference map of Lancaster County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Lancaster County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Drought and hurricanes/tropical storms are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Lancaster County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	7	158	22.57	4.43
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59.00	1.69
Flood	10	59	5.90	16.95
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	0	310	*	*
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	40	22	0.55	181.82**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	12,235	10	<0.50	122,350.00**
Severe Thunderstorm Events				
Funnel Cloud	2	16	8.00	12.50
Hail	54	59	1.09	91.53
Heavy Precipitation	0	15	*	*
Lightning	8	16	2.00	50.00
Thunderstorm & Wind	98	59	0.60	166.10**
Tornado	9	59	6.56	15.25
Temperature Extremes	0	16	*	*
Wildfire	914	21	<0.50	4,352.38**
Winter Weather (Snow & Ice)	15	59	3.93	25.42

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Lancaster County has a higher probability of loss-producing wildfire and winter weather, and is slightly above the state average for drought and hail events. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Thunderstorms, wind, and tornadoes are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

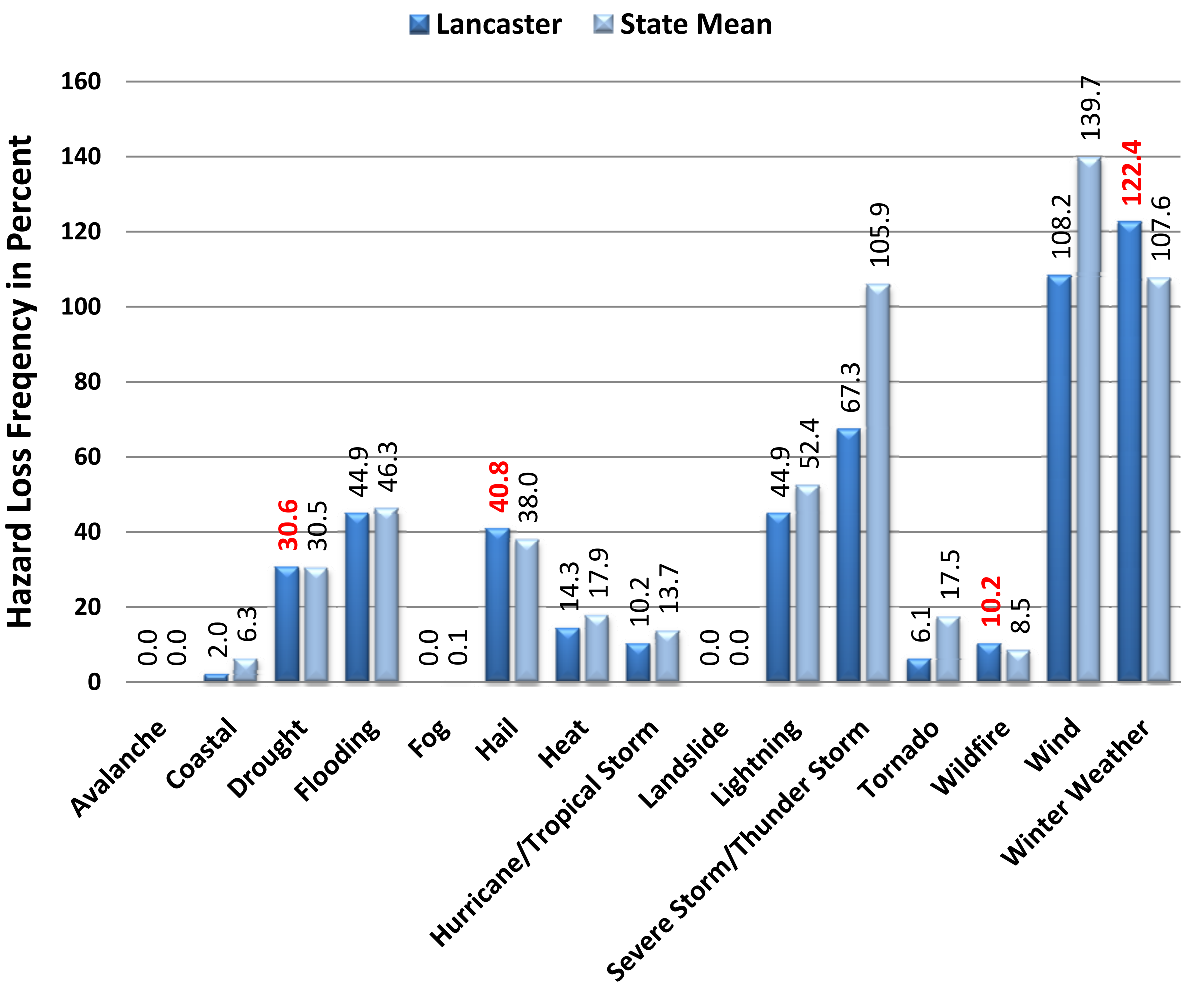


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Lancaster County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Lancaster County exceed $236 million, and are largely due to hurricanes and tropical storms, followed by winter weather, and drought. Hurricane/tropical storm represented 73% of the historic damage in Lancaster County. While significant for the county, these cumulative losses represent 2.5% of the state's total overall, but 18% of the state's total damages related to hurricane/tropical storms. Hail and wind also produce significant losses for the county, representing 8% and 6% of the state's losses.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$449,814	0.29%
Hail	$8,503,402	8.25%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$173,668,903	3.15%
Lightning	$519,597	0.99%
Severe Storm/ Thunder Storm	$738,107	0.35%
Tornado	$3,145,629	1.33%
Wildfire	$347,075	2.17%
Wind	$8,868,803	6.08%
Winter Weather	$15,140,493	1.68%
Lancaster - Total	**$236,733,420**	**2.47%**

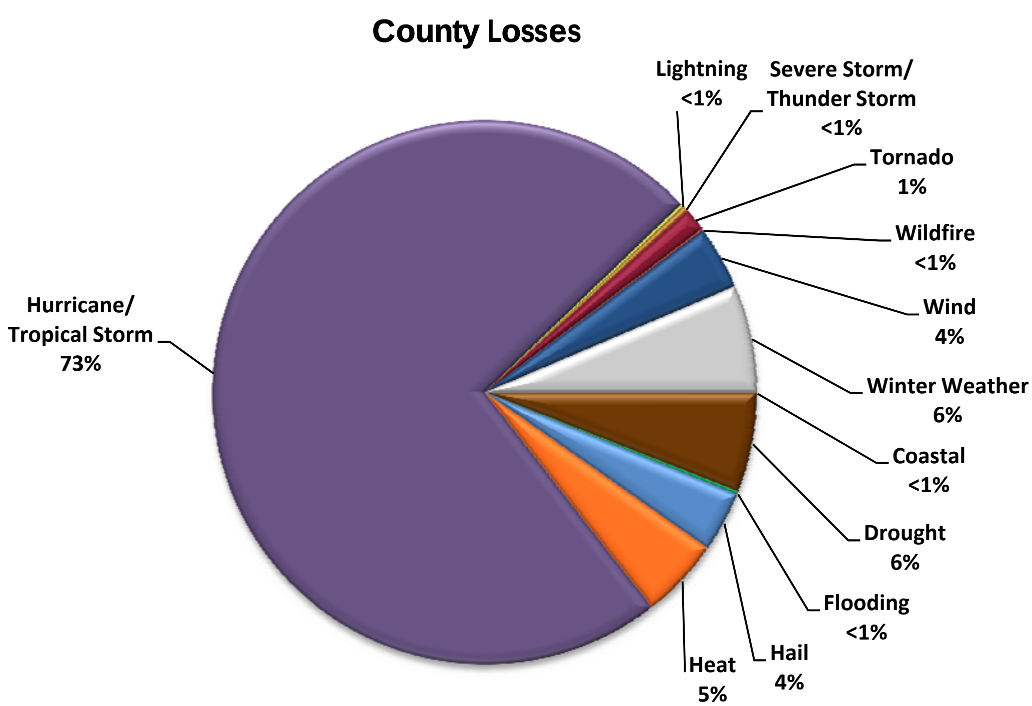
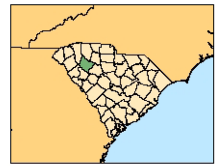


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Lancaster County, SC.

LAURENS COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Laurens County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents). Winter weather and tornadoes produce the most monetary damage and are relatively frequent events with a recurrence interval is 2.2 and 4.9 years, respectively. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Laurens County, most of the census tracts exhibit moderate category of social vulnerability. Census tracts in the northeastern parts of the county show moderately elevated SoVI scores, and the city of Laurens shows elevate levels of social vulnerability. Figure 1 provides maps of the Laurens County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

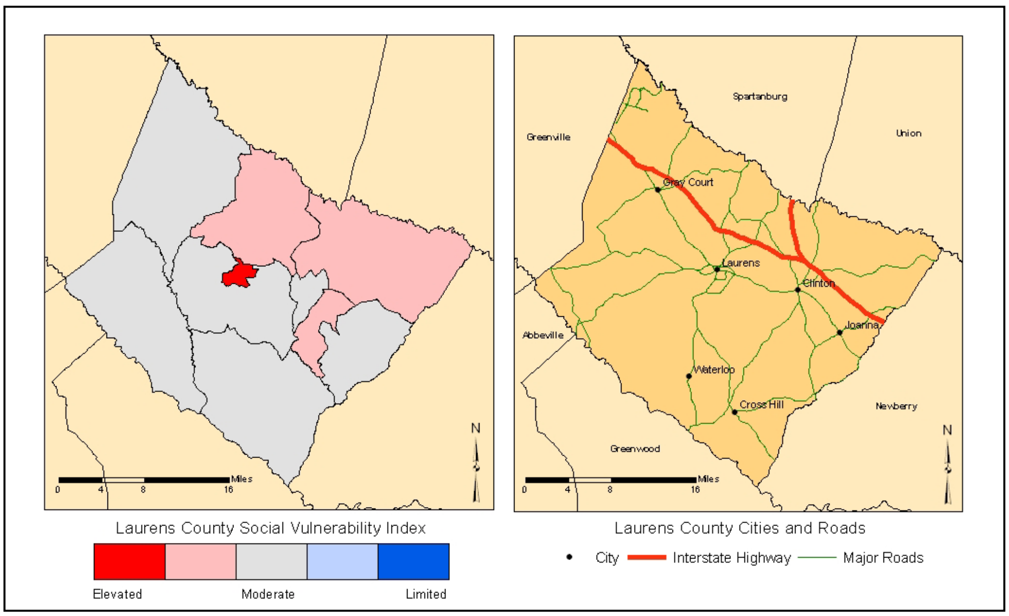


FIGURE 1. The Social Vulnerability for Laurens County, SC by US Census tracts and a general reference map of Laurens County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Laurens County are hazardous material accidents, severe thunderstorm events, and wildfires. Earthquakes, avalanches, and hurricanes/tropical storms are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Laurens County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	5	158	31.60	3.16
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	33	59	1.79	55.93
Flood	29	59	2.03	49.15
Fog	3	12	4.00	25.00
Geophysical Events				
Avalanche	1	49	49.00	2.04
Earthquake	6	310	51.67	1.94
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	84	22	<0.50	381.82**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	14,116	10	<0.50	141,160**
Severe Thunderstorm Events				
Funnel Cloud	3	16	5.33	18.75
Hail	89	59	0.66	150.85**
Heavy Precipitation	32	15	<0.50	213.33**
Lightning	7	16	2.29	43.75
Thunderstorm & Wind	208	59	<0.50	352.54**
Tornado	12	59	4.92	20.34
Temperature Extremes	5	16	3.20	31.25
Wildfire	1,054	21	<0.50	5,019.05**
Winter Weather (Snow & Ice)	27	59	2.19	45.76

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Laurens County has a higher probability of loss-producing avalanches, hail, lightning, tornado, and winter weather events. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. The remaining hazards are at or slightly below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

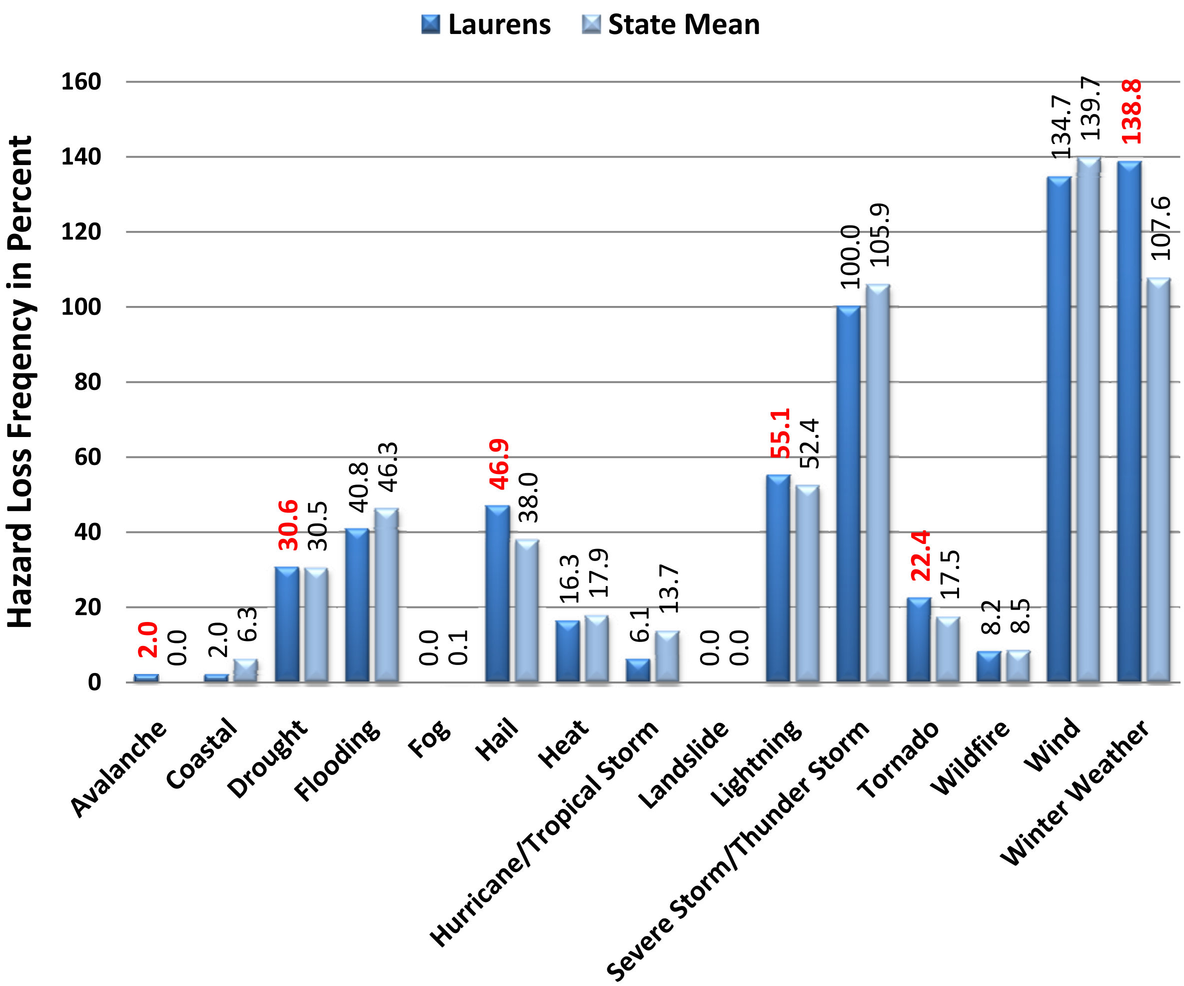


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Laurens County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Laurens County exceed $83 million, and are largely due to winter weather, tornadoes, drought, and heat. While significant for the county, these cumulative losses represent less than one percent of the state's total overall losses. Tornadic events in Laurens County account for 7% of the state's total damages related to tornadoes.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Avalanche	$2,826	100.00%
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$6,569,031	4.24%
Hail	$1,683,499	1.63%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$329,868	0.01%
Lightning	$2,073,860	3.95%
Severe Storm/ Thunder Storm	$4,951,788	2.34%
Tornado	$17,428,477	7.37%
Wildfire	$334,042	2.09%
Wind	$3,555,599	2.44%
Winter Weather	$21,259,375	2.36%
Laurens - Total	**$83,539,964**	**0.87%**

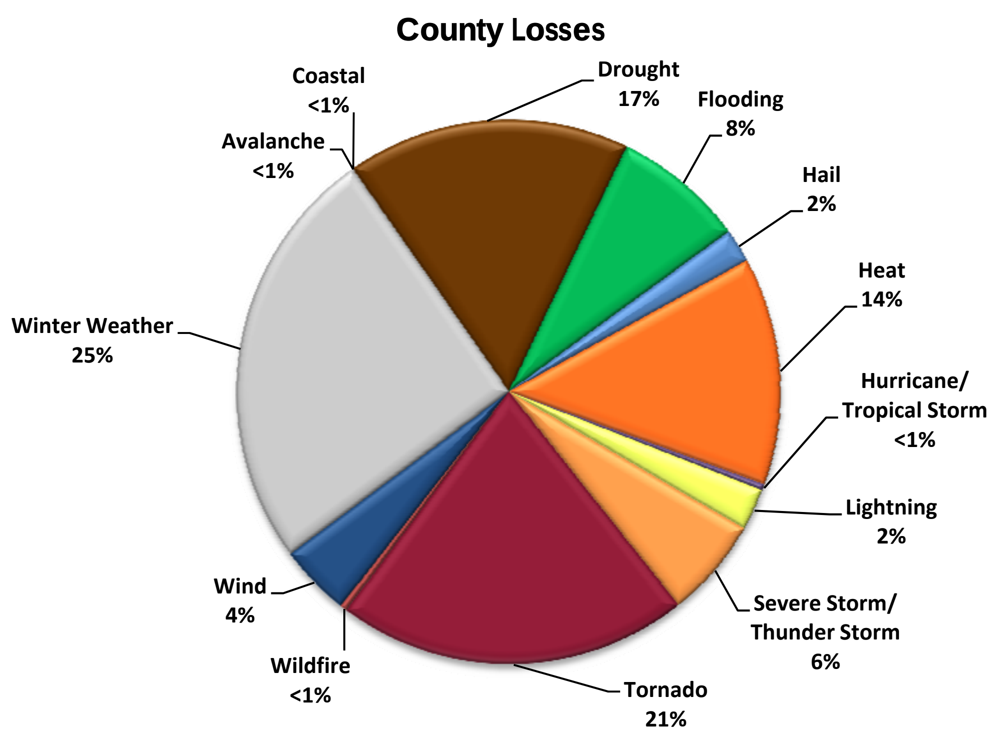
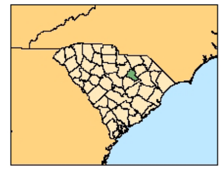


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Laurens County, SC.

LEE COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Lee County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Hurricane/tropical storms produce the greatest monetary damage; however, the recurrence interval is 14.3 years, making it a relatively rare event. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Lee County, most of the census tracts exhibit moderate to elevated levels of social vulnerability. The exception is the census tract containing Lee County Correctional Institute with the limited SoVI scores. Figure 1 provides maps of the Lee County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

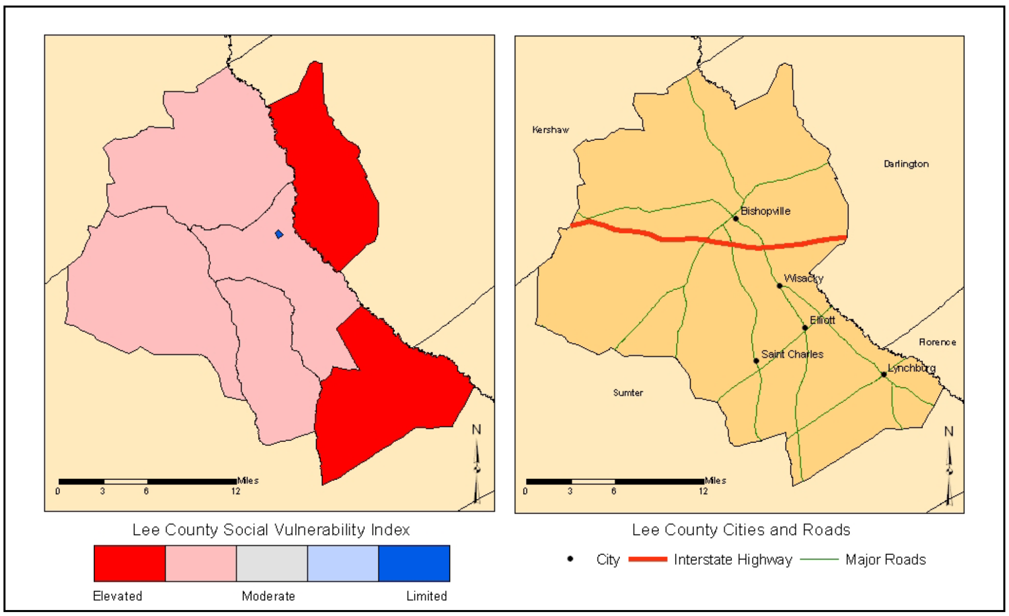


FIGURE 1. The Social Vulnerability for Lee County, SC by US Census tracts and a general reference map of Lee County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
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Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Lee County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Earthquakes and drought are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Lee County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	11	158	14.36	6.96
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59.00	1.69
Flood	6	59	9.83	10.17
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	1	310	310.00	0.32
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	57	22	<0.50	259.09**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	3,273	10	<0.50	32,730**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	40	59	1.48	67.80
Heavy Precipitation	1	15	15.00	6.67
Lightning	1	16	16.00	6.25
Thunderstorm & Wind	77	59	0.77	130.51**
Tornado	9	59	6.56	15.25
Temperature Extremes	0	16	*	*
Wildfire	1,663	21	<0.50	7,919.05**
Winter Weather (Snow & Ice)	6	59	9.83	10.17

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)

** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year

\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Lee County has a lower probability of loss-producing hazards than the statewide average for all hazards. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Hazards affecting Lee County have historically produced fewer losses for the county when compared to the state as a whole.

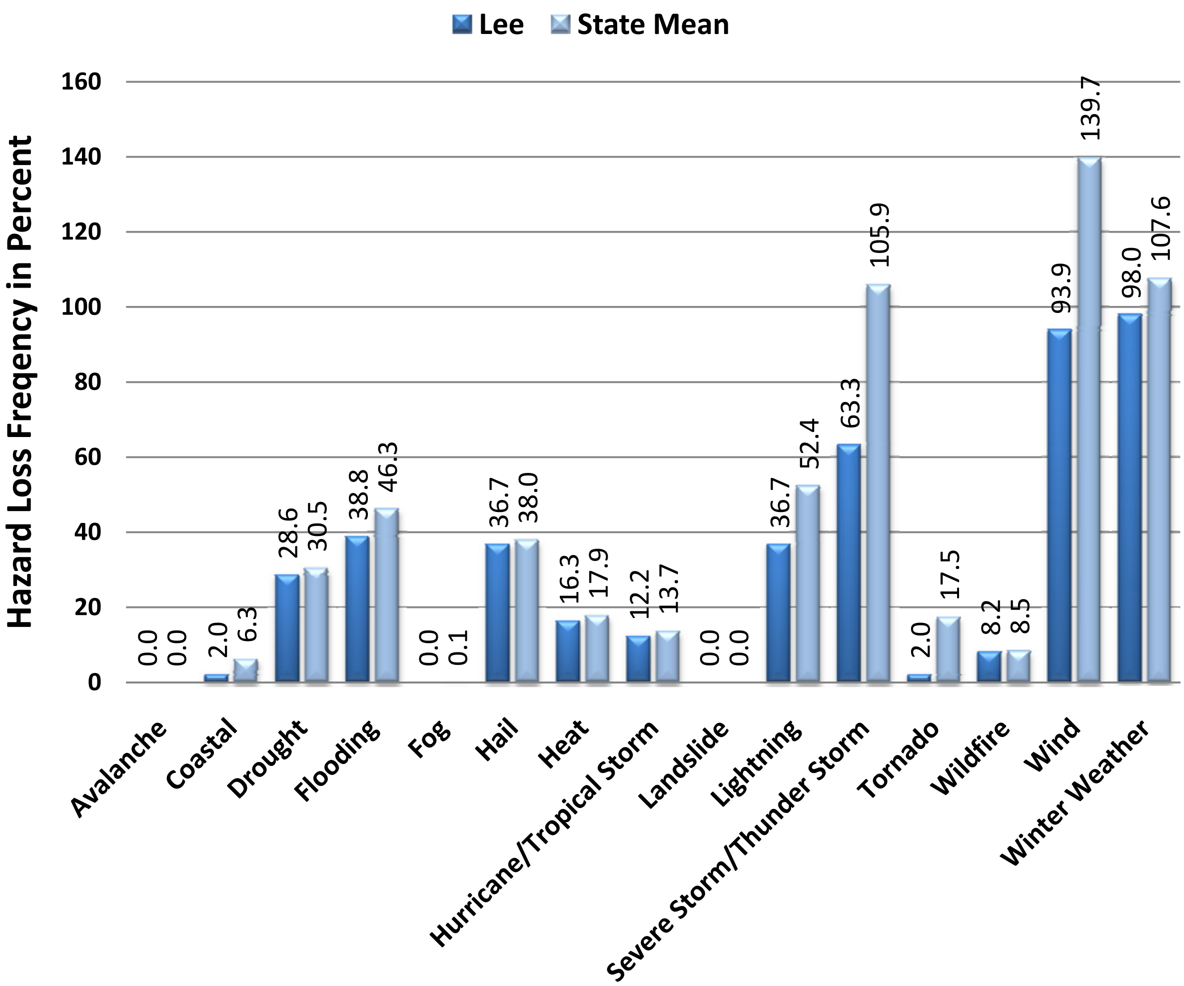


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Lee County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Lee County exceed $227 million, and are largely due to hurricanes and tropical storms, followed by drought, heat, winter weather, and severe thunderstorms. Hurricane/tropical storm represented 77% of the damage in Lee County. While significant for the county, these cumulative losses represent around 2% of the state's total overall, while 5% of the state's total damages are caused severe thunderstorms.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,055,942	2.17%
Flooding	$463,717	0.30%
Hail	$600,155	0.58%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$174,314,866	3.16%
Lightning	$283,909	0.54%
Severe Storm/ Thunder Storm	$10,398,577	4.92%
Tornado	$5,200	0.01%
Wildfire	$334,042	2.09%
Wind	$831,711	0.57%
Winter Weather	$14,655,372	1.63%
Lee - Total	**$227,236,610**	**2.37%**

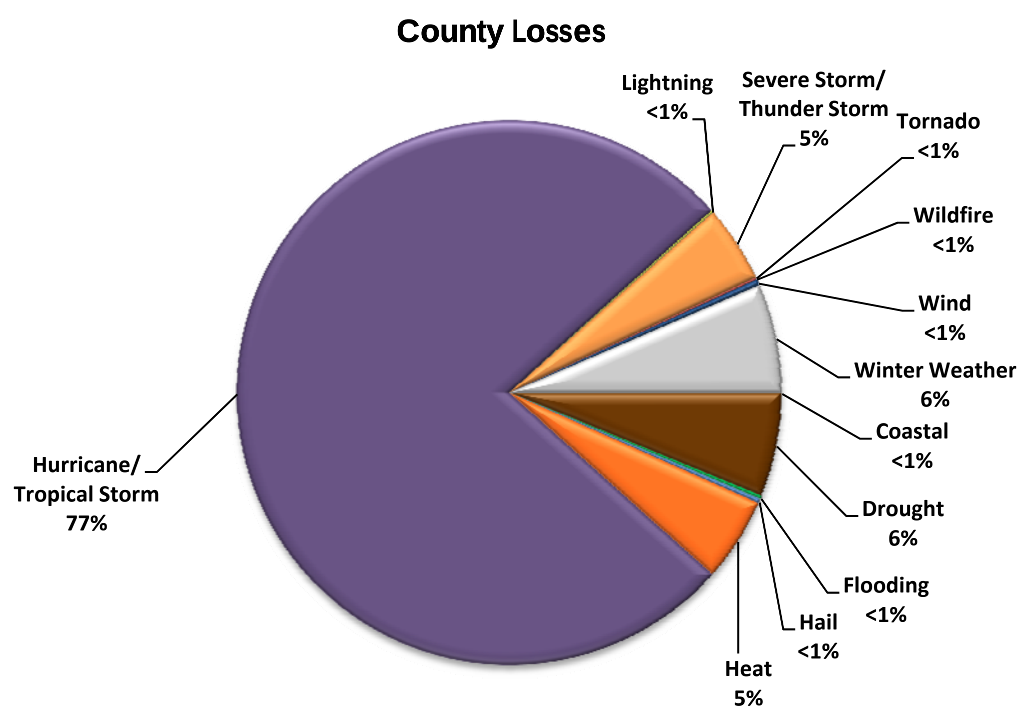
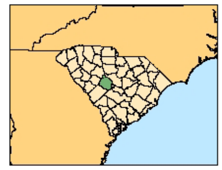


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Lee County, SC.

LEXINGTON COUNTY, SC



Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008

I. Summary

Lexington County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Winter weather and drought produce the greatest monetary damage; however, the recurrence interval is 59 years and 8.4 years respectively, making these relatively rare events. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Lexington County, most of the census tracts exhibit moderate to limited levels of social vulnerability. The exceptions are in West Columbia, Cayce, and Batesburg-Leesville. Figure 1 provides maps of the Lexington County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

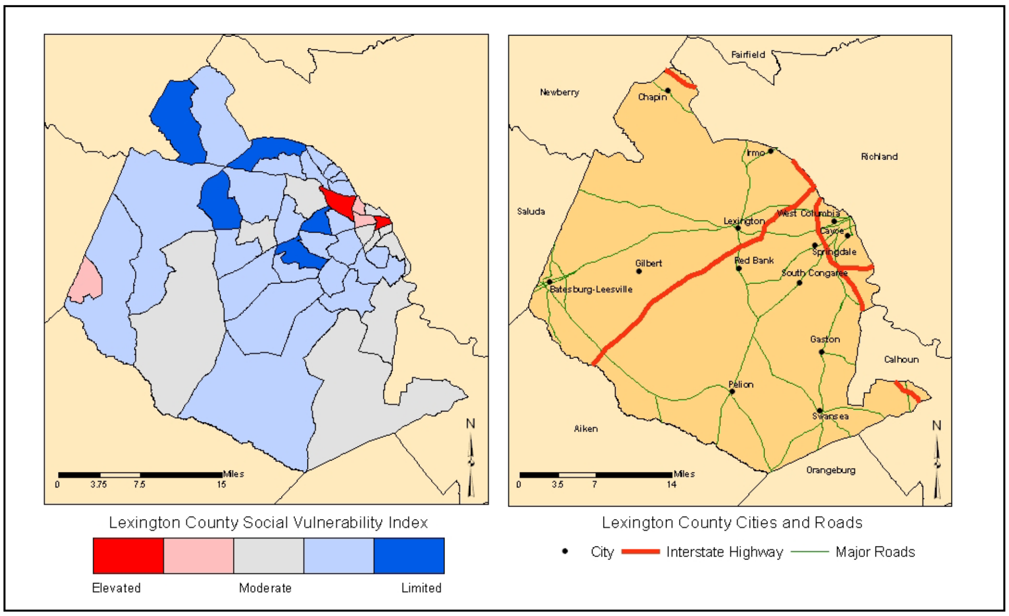


FIGURE 1. The Social Vulnerability for Lexington County, SC by US Census tracts and a general reference map of Lexington County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Lexington County are hazardous material accidents, severe thunderstorms and wind, hail, and wildfires. Droughts and earthquakes are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Lexington County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	9	158	17.56	5.70
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59.00	1.69
Flood	17	59	3.47	28.81
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	6	310	51.67	1.94
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	274	22	<0.50	1,245.45**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	53,758	10	<0.50	537,580**
Severe Thunderstorm Events				
Funnel Cloud	2	16	8.00	12.50
Hail	168	59	<0.50	284.75**
Heavy Precipitation	0	15	*	*
Lightning	7	16	2.29	43.75
Thunderstorm & Wind	313	59	<0.50	530.51**
Tornado	22	59	2.68	37.29
Temperature Extremes	0	16	*	*
Wildfire	4,341	21	<0.50	20,671.43**
Winter Weather (Snow & Ice)	7	59	8.43	11.86

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Lexington County has a higher probability of loss-producing lightning, thunderstorm, and wind events. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Flooding and drought are slightly above the state average as well. Winter weather is well below the state mean indicating that this hazard has historically produced fewer losses for the county when compared to the state as a whole.

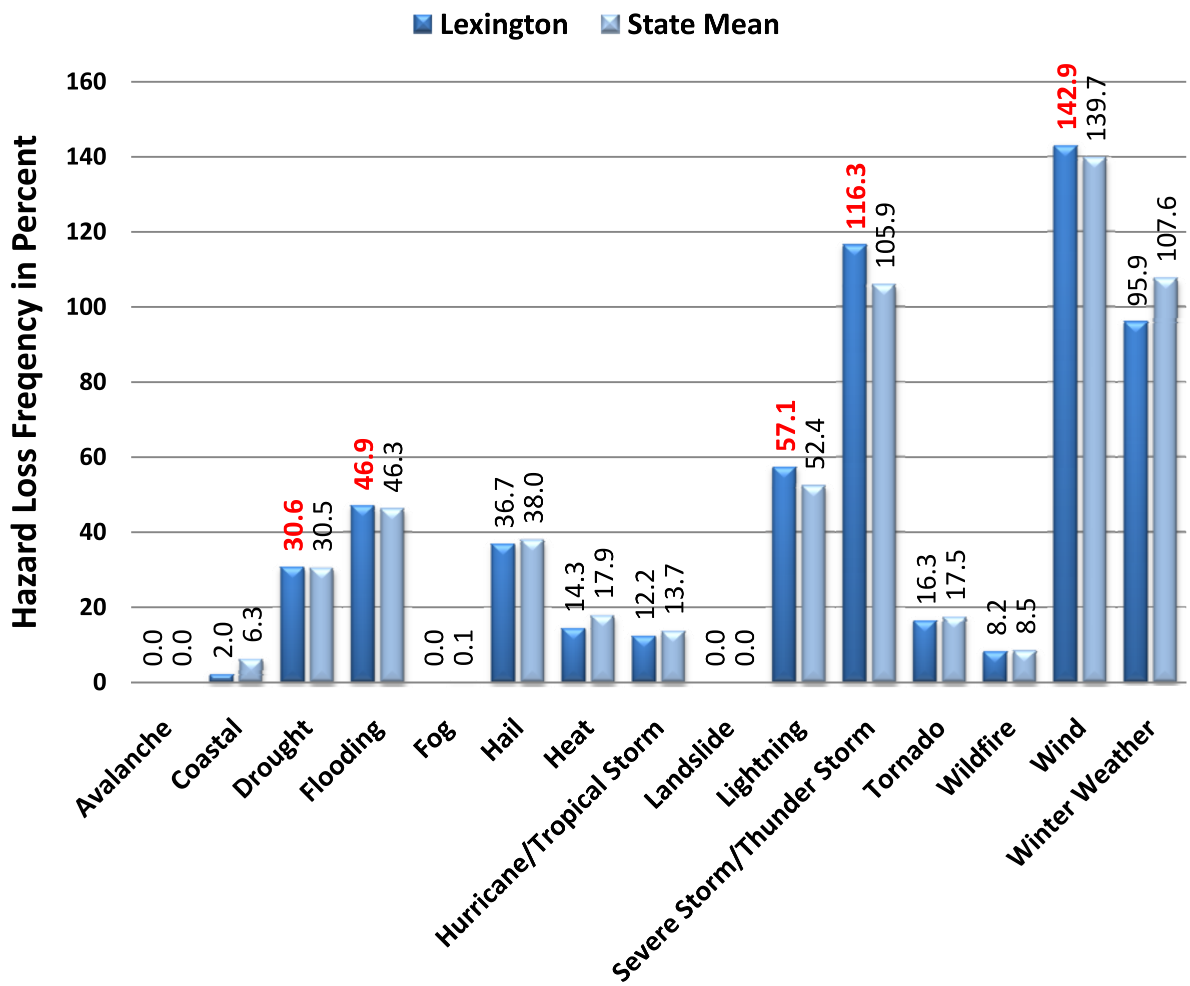


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Lexington County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Lexington County exceed $57 million, and are largely due to winter weather, drought, heat, and tornadoes. While significant for the county, these cumulative losses represent less than one percent of the state's total overall.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$1,344,802	0.87%
Hail	$389,738	0.38%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$1,076,866	0.02%
Lightning	$1,889,247	3.60%
Severe Storm/ Thunder Storm	$1,276,048	0.60%
Tornado	$10,170,899	4.30%
Wildfire	$334,042	2.09%
Wind	$1,468,278	1.01%
Winter Weather	$14,646,000	1.63%
Lexington - Total	**$57,947,517**	**0.61%**

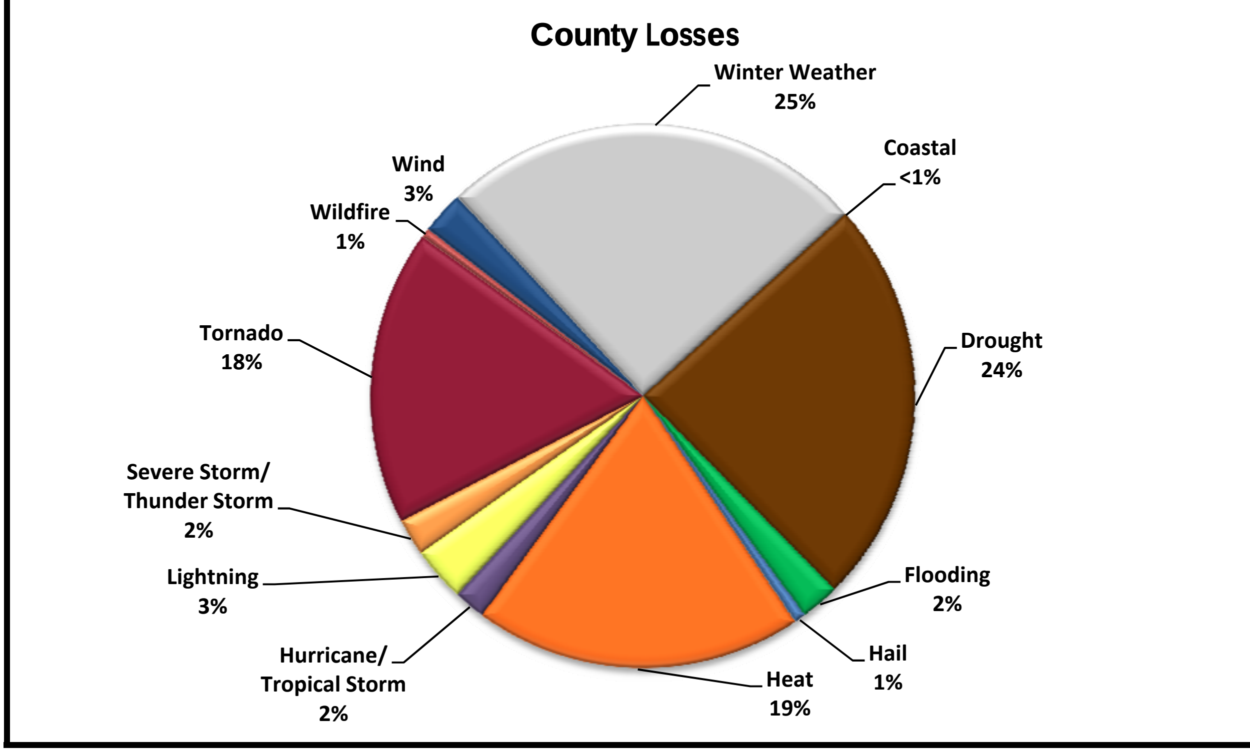
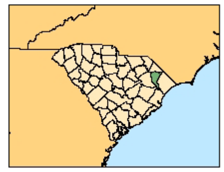


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Lexington County, SC.

MARION COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Marion County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents). Winter weather produces the highest monetary damage; however, the recurrence interval is 8.4 years, making it a relatively rare event. Wildfires, thunderstorms, hail, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Marion County, most of the census tracts exhibit moderately elevated levels of social vulnerability. Figure 1 provides maps of the Marion County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

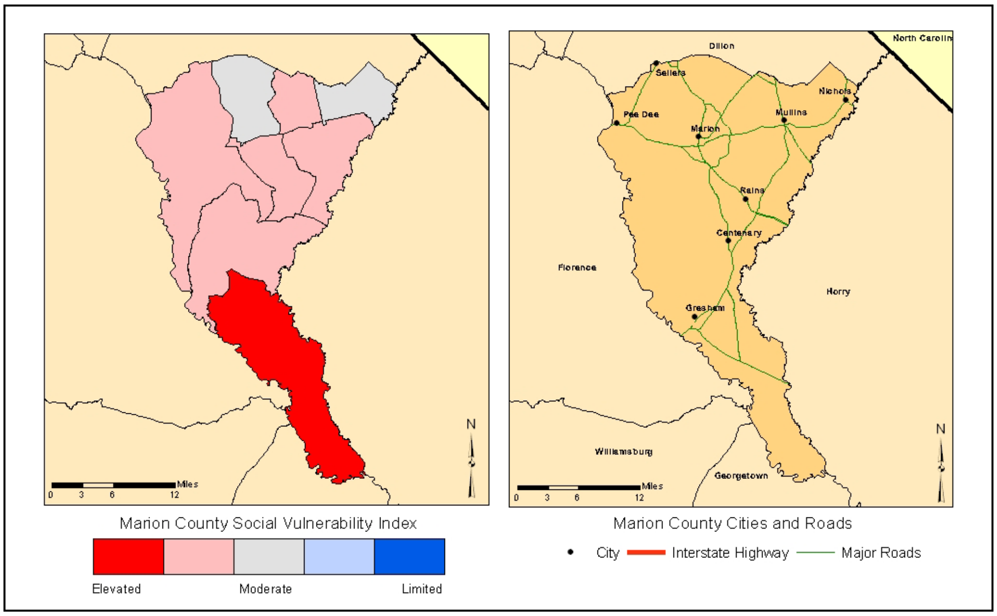


FIGURE 1. The Social Vulnerability for Marion County, SC by US Census tracts and a general reference map of Marion County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Marion County are hazardous material accidents, severe thunderstorms and wind, hail, and wildfires. Flooding, ocean & lake surf, and winter weather are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Marion County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	13	158	12.15	8.23
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	8	59	7.38	13.56
Flood	9	59	6.56	15.25
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	9	310	34.44	2.90
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	23	22	0.96	104.55**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	5,028	10	<0.50	50,280.00**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	61	59	0.97	103.39**
Heavy Precipitation	0	15	*	*
Lightning	6	16	2.67	37.50
Thunderstorm & Wind	92	59	0.64	155.93**
Tornado	8	59	7.38	13.56
Temperature Extremes	0	16	*	*
Wildfire	908	21	<0.50	4,323.81**
Winter Weather (Snow & Ice)	7	59	8.43	11.86

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Marion County has a higher probability of loss-producing hurricane/tropical storms, and hail events. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Thunderstorms, wind, and winter weather are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

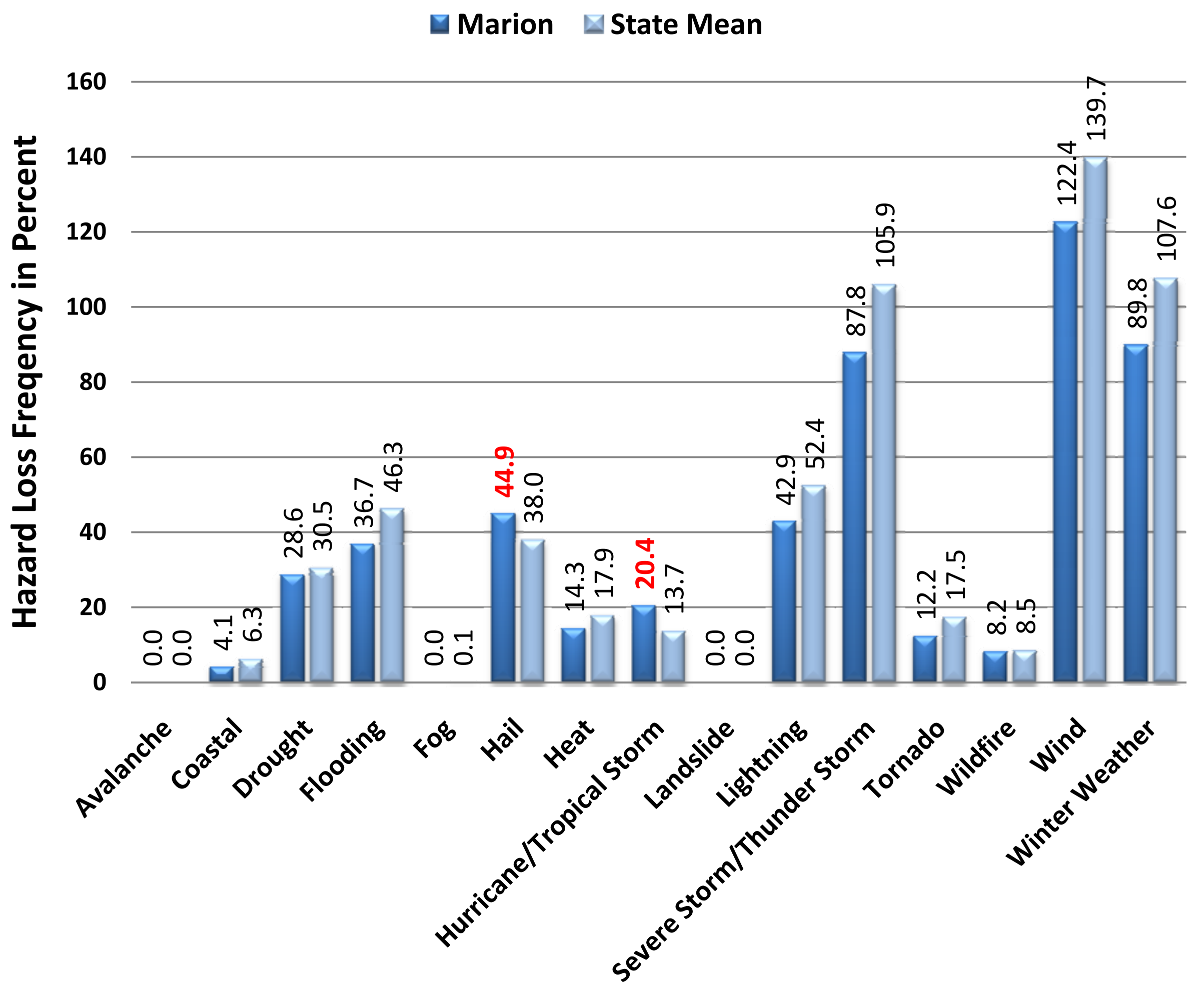


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Marion County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Marion County exceed $62 million, and are largely due to winter weather, drought, heat, and hurricane/tropical storms. While significant for the county, these cumulative losses represent less than one percent the state's overall total.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$287,032	0.03%
Drought	$14,055,942	2.17%
Flooding	$621,528	0.40%
Hail	$994,555	0.96%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$10,448,061	0.19%
Lightning	$679,419	1.29%
Severe Storm/ Thunder Storm	$1,268,989	0.60%
Tornado	$3,002,730	1.27%
Wildfire	$334,042	2.09%
Wind	$2,260,450	1.55%
Winter Weather	$17,757,442	1.97%
Marion - Total	**$62,996,834**	**0.66%**

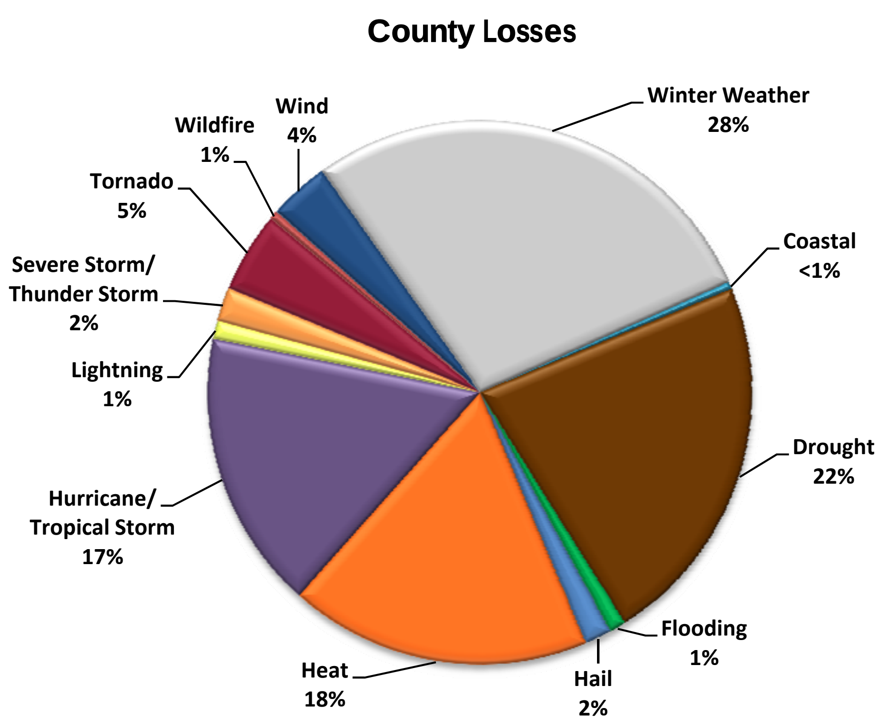
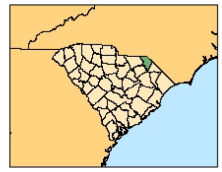


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Marion County, SC.

MARLBORO COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Marlboro County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents). Severe thunderstorms produce the greatest monetary damage and are among the most frequent of all hazards, especially those that result in substantial dollar losses. Wildfires and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Marlboro County, most of the census tracts exhibit moderate to elevated levels of social vulnerability. Census tracts in the southern part of the county have among the highest SoVI scores in the state. Figure 1 provides maps of the Marlboro County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

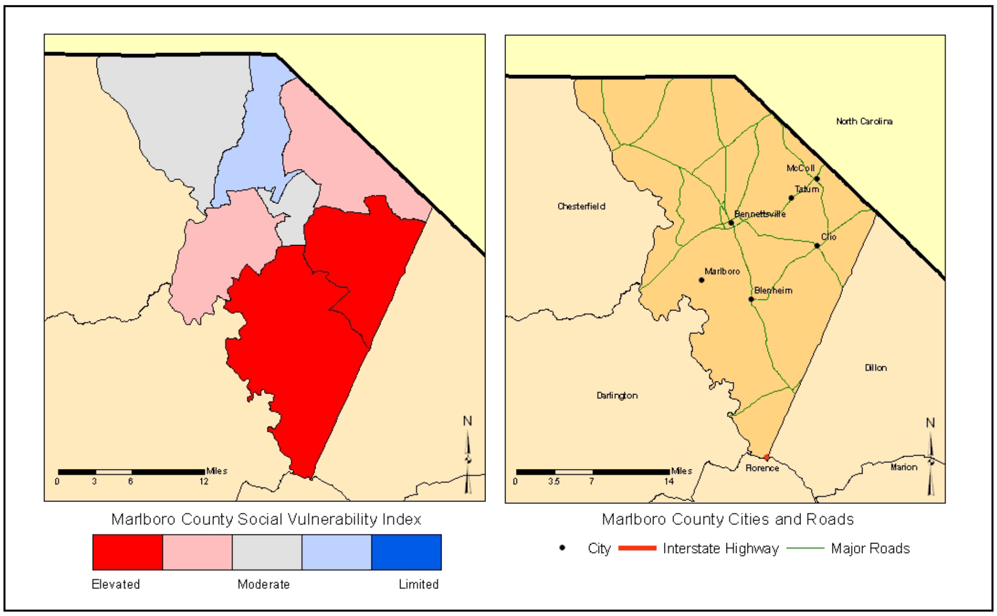


FIGURE 1. The Social Vulnerability for Marlboro County, SC by US Census tracts and a general reference map of Marlboro County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.

Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.

Hazard – the potential threat to humans as well as the impact of an event on society and the environment.

Recurrence – a calculated number that examines the expected time interval between events based on the historic record.

Risk – the likelihood or probability of occurrence of a hazard or adverse event.

Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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University of South Carolina
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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Marlboro County are wildfires, thunderstorms and wind, and hazardous material accidents. Earthquakes, ocean and lake surf, and hurricane/tropical storms are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Marlboro County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	13	158	12.15	8.23
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	11	59	5.36	18.64
Flood	6	59	9.83	10.17
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	2	310	155.00	0.65
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	28	22	0.79	127.27**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	5,596	10	<0.50	55,960.00**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	46	59	1.28	77.97
Heavy Precipitation	1	15	15.00	6.67
Lightning	5	16	3.20	31.25
Thunderstorm & Wind	95	59	0.620	161.02**
Tornado	14	59	4.210	23.73
Temperature Extremes	0	16	*	*
Wildfire	1,567	21	<0.50	7,461.90**
Winter Weather (Snow & Ice)	15	59	3.93	25.42

[a] Data Sources: National Climatic Data Center (**www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm**); National Geophysical Data Center (**www.ngdc.noaa.gov/hazard/**
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Marlboro County has a higher probability of loss-producing hail, hurricane/tropical storm, and winter weather events. The county has slightly more than the average of tornado loss events. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Hail, thunderstorms, tornadoes, and winter weather are above the state mean indicating that these hazards have historically produced more losses for the county when compared to the state as a whole.

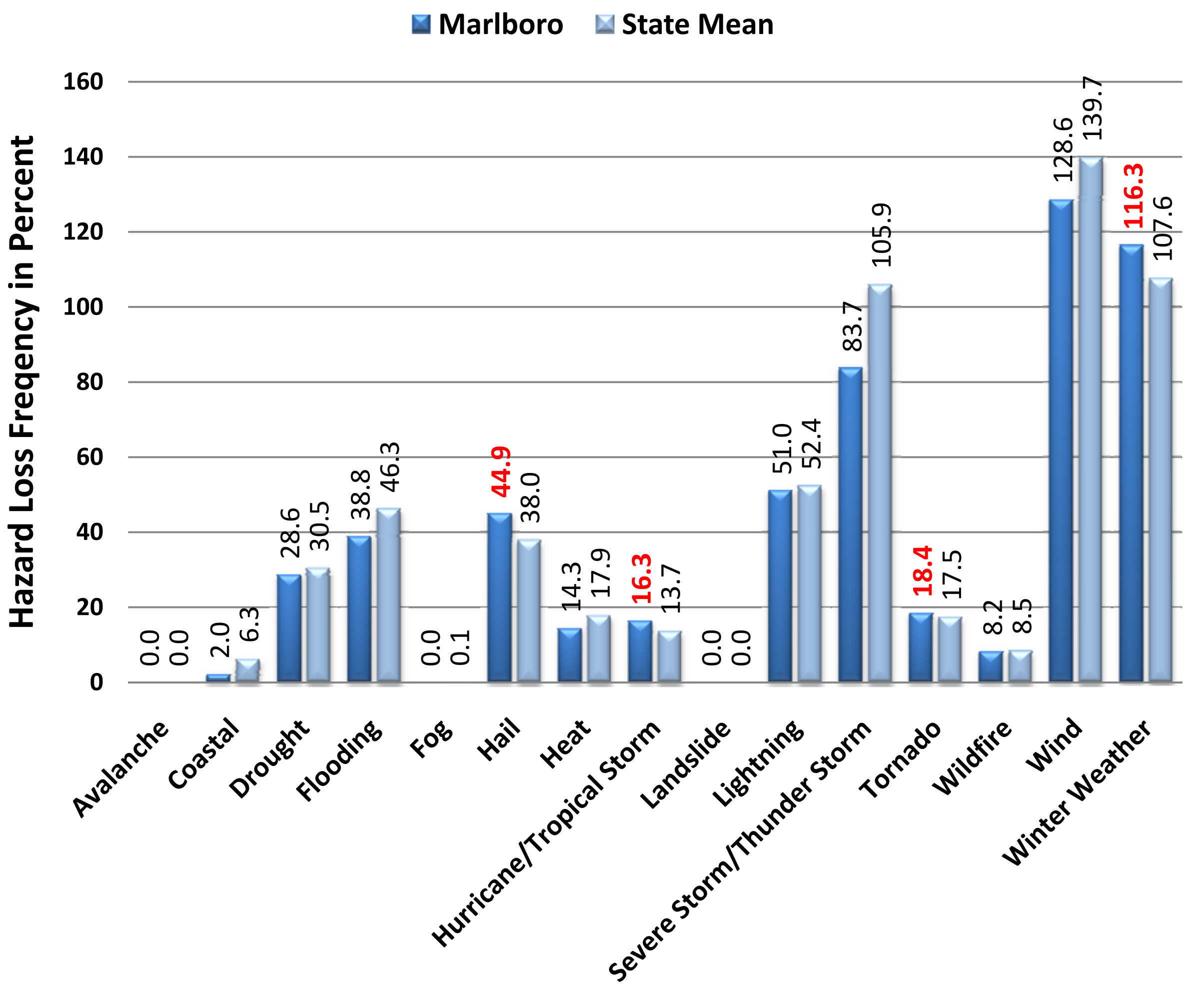


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Marlboro County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Marlboro County exceed $168 million, and are largely due to severe thunderstorms, tornadoes, and winter weather. While significant for the county, these cumulative losses represent 1.8% of the state's total overall. However, the severe thunderstorm losses represent 52% of county losses and more than 41% of the statewide losses. Tornadoes occurring in Marlboro County account for over 9% of statewide tornado losses.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,055,942	2.17%
Flooding	$559,162	0.36%
Hail	$1,180,899	1.15%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$10,301,543	0.19%
Lightning	$418,084	0.80%
Severe Storm/ Thunder Storm	$87,687,048	41.51%
Tornado	$21,609,949	9.13%
Wildfire	$334,042	2.09%
Wind	$1,315,402	0.90%
Winter Weather	$19,533,078	2.17%
Marlboro - Total	**$168,288,268**	**1.76%**

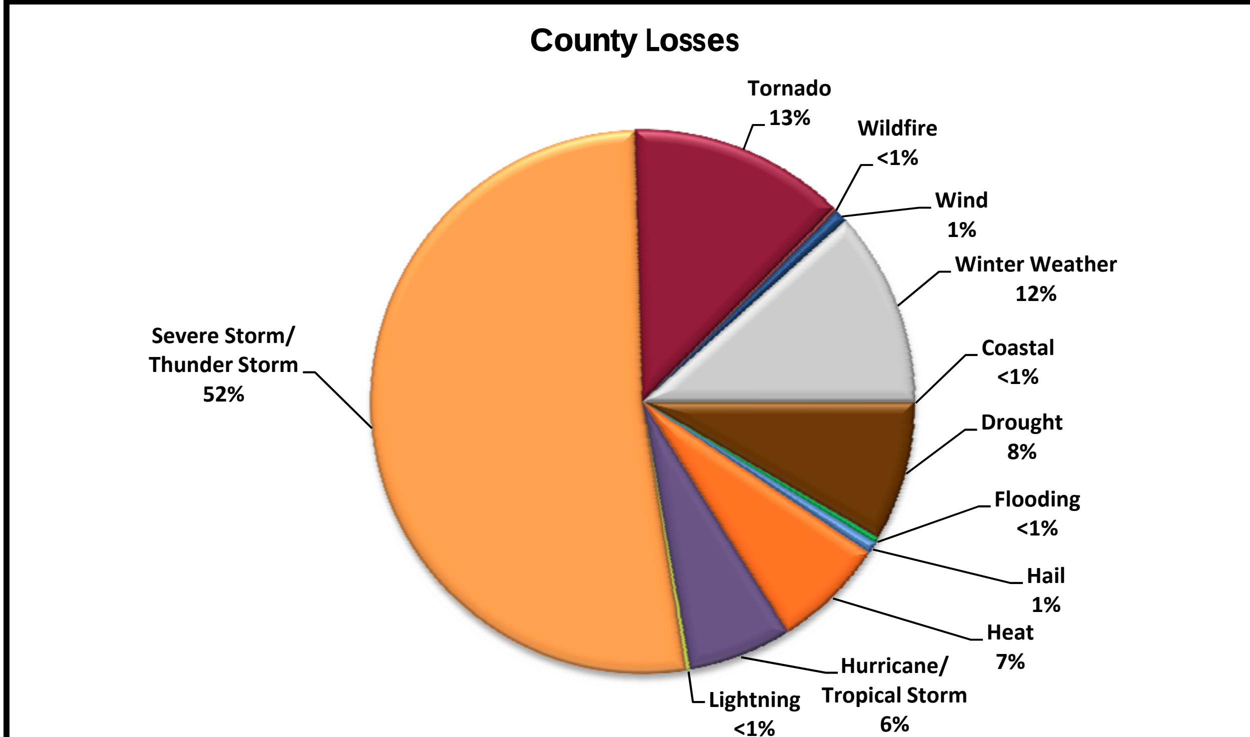
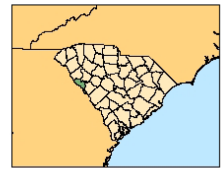


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Marlboro County, SC.

McCORMICK COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

McCormick County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Winter weather produced the greatest monetary damage; however, the recurrence interval is 7.8 years, making it a relatively rare event. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within McCormick County, most of the census tracts show moderate level of social vulnerability. The Census tract in the northern third of the county (Mount Carmel area) exhibit elevated SoVI score. Figure 1 provides maps of the McCormick County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

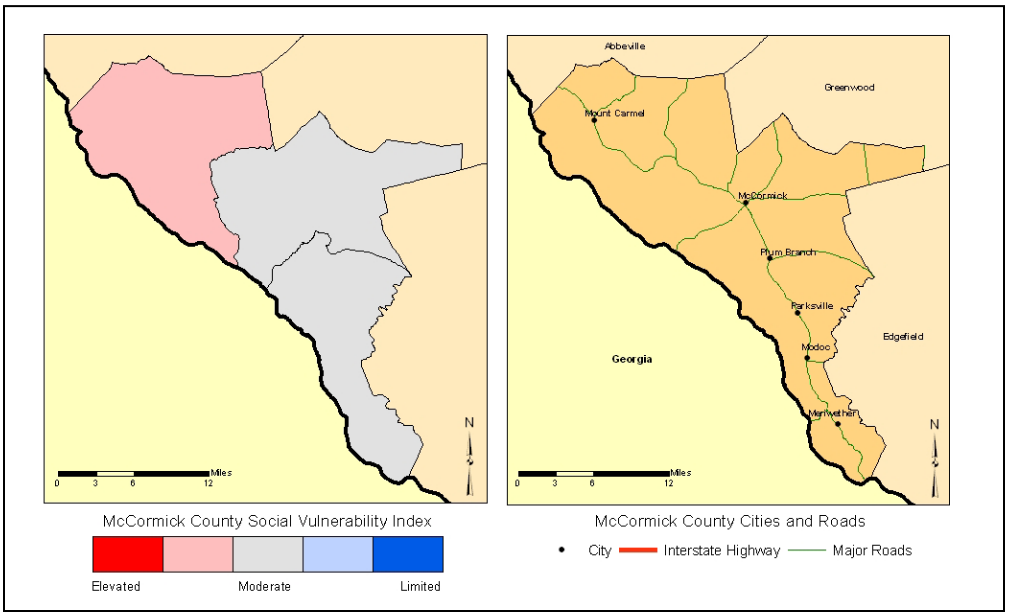


FIGURE 1. The Social Vulnerability for McCormick County, SC by US Census tracts and a general reference map of McCormick County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in McCormick County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Droughts and hurricanes/tropical storms are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for McCormick County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	4	158	39.5	2.53
Ocean & Lake Surf[b]	1	16	16	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59	1.69
Flood	4	59	14.75	6.78
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	0	310	*	*
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	44	22	0.50	200.00**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	2,473	10	<0.50	24,730.00**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	29	59	2.03	49.15
Heavy Precipitation	6	15	2.50	40.00
Lightning	2	16	8.00	12.50
Thunderstorm & Wind	50	59	1.18	84.75
Tornado	14	59	4.21	23.73
Temperature Extremes	0	16	*	*
Wildfire	716	21	<0.50	3,409.52**
Winter Weather (Snow & Ice)	8	59	7.38	13.56

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, McCormick County has only a slightly higher probability of loss-producing drought events. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Thunderstorms, wind, and winter weather are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

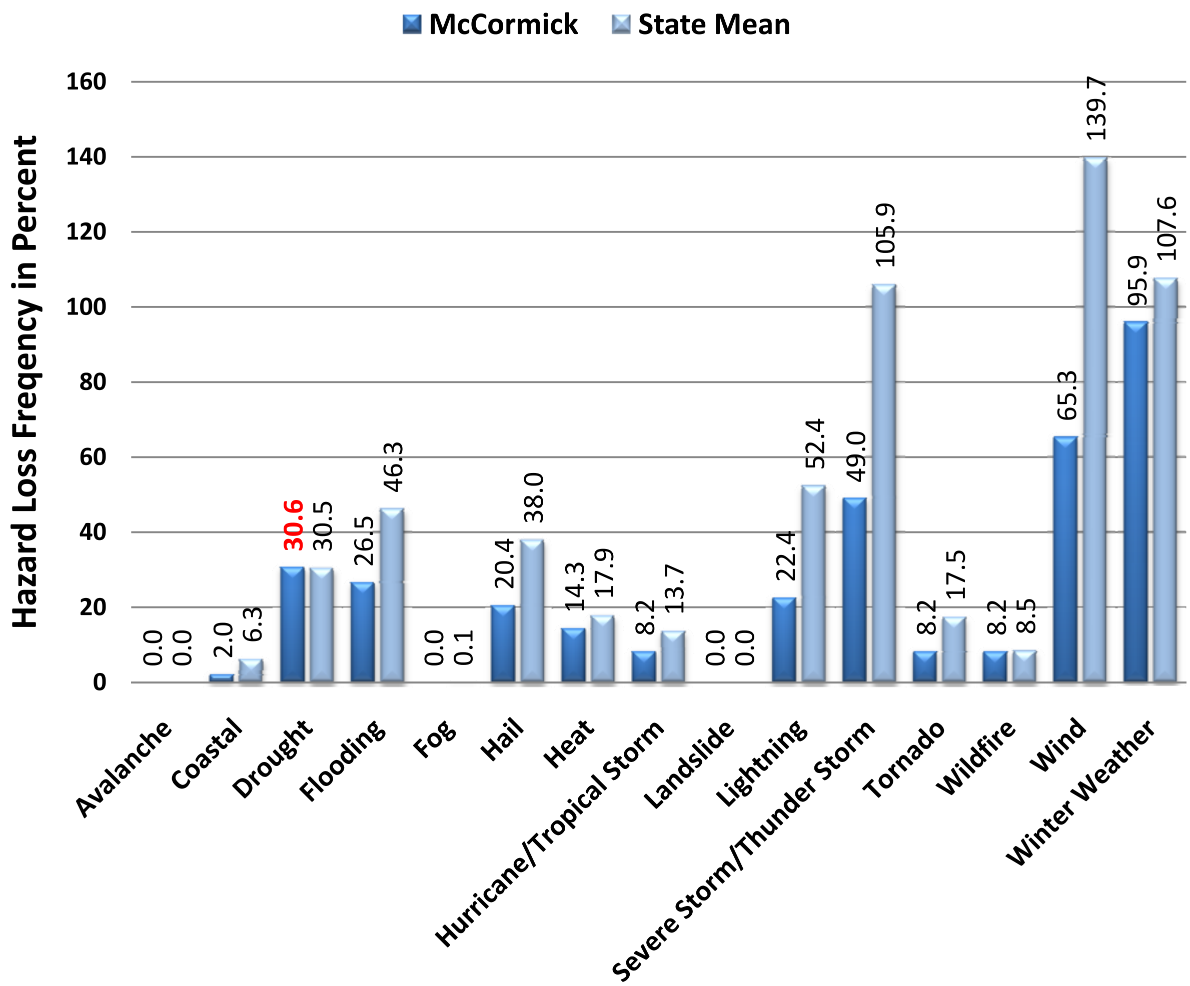


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for McCormick County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in McCormick County exceed $46 million, and are largely due to winter weather, drought, and heat. While significant for the county, these cumulative losses represent less than one percent of the state's overall total.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$321,092	0.21%
Hail	$390,768	0.38%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$3,092,368	0.06%
Lightning	$185,995	0.35%
Severe Storm/ Thunder Storm	$643,337	0.30%
Tornado	$605,346	0.26%
Wildfire	$334,042	2.09%
Wind	$343,104	0.24%
Winter Weather	$15,224,842	1.69%
McCormick - Total	**$46,492,492**	**0.49%**

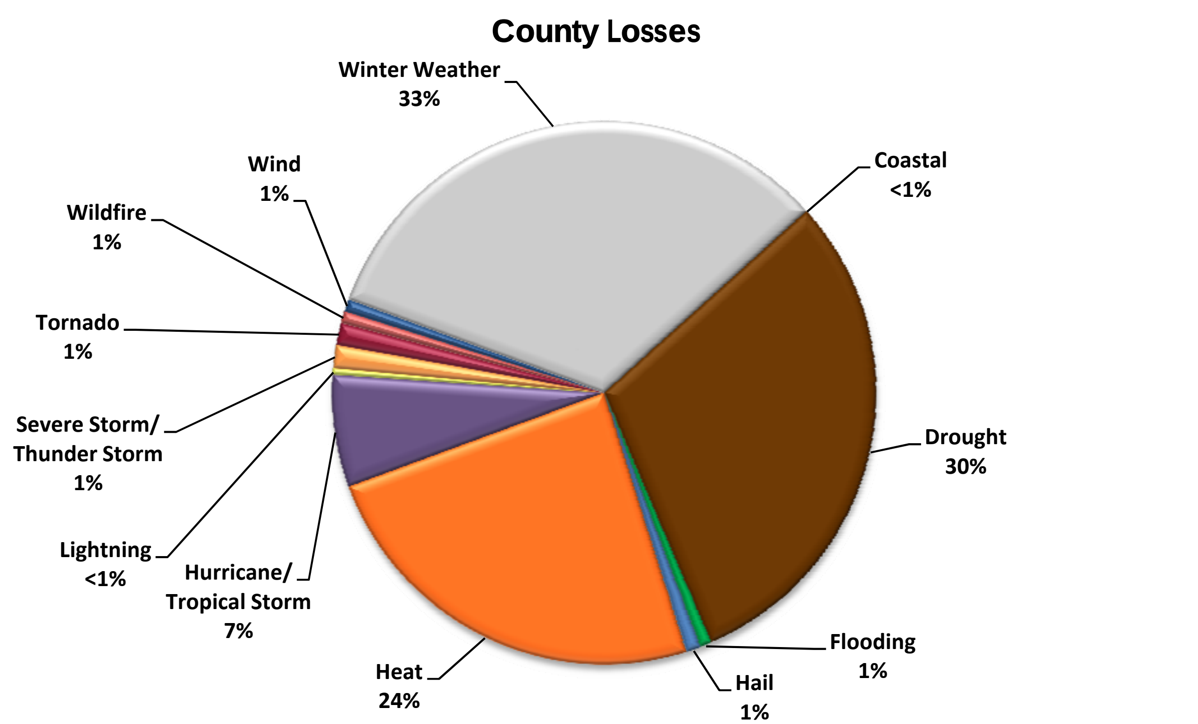
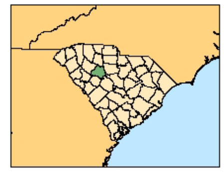


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for McCormick County, SC.

NEWBERRY COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Newberry County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Winter weather produces the greatest monetary damage; however, the recurrence interval is 4.9 years, making it a less common event than tornadoes and hail, which also produce significant losses f or the county. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Newberry County, most of the census tracts exhibit moderate levels of social vulnerability. Census tracts in the center of the county, including those in Newberry city exhibit the highest SoVI scores. Figure 1 provides maps of the Newberry County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

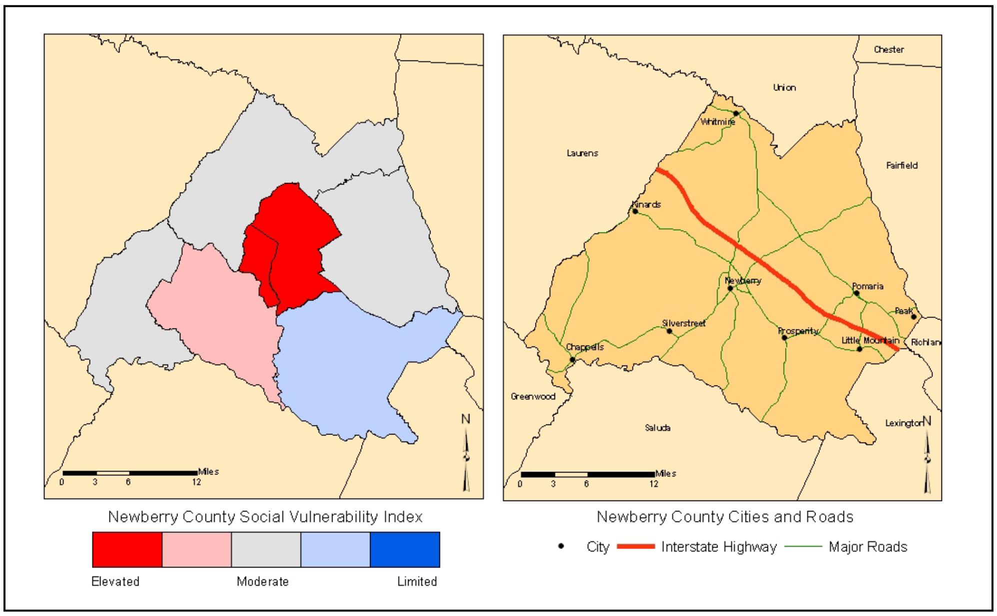


FIGURE 1. The Social Vulnerability for Newberry County, SC by US Census tracts and a general reference map of Newberry County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.

Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.

Hazard – the potential threat to humans as well as the impact of an event on society and the environment.

Recurrence – a calculated number that examines the expected time interval between events based on the historic record.

Risk – the likelihood or probability of occurrence of a hazard or adverse event.

Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Newberry County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Drought and hurricanes/tropical storms are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Newberry County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	6	158	26.33	3.80
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59.00	1.69
Flood	6	59	9.83	10.17
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	21	310	14.76	6.77
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	57	22	<0.50	259.09**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	7,830	10	<0.50	78,300.00**
Severe Thunderstorm Events				
Funnel Cloud	1	16	16.00	6.25
Hail	64	59	0.92	108.47**
Heavy Precipitation	0	15	*	*
Lightning	1	16	16.00	6.25
Thunderstorm & Wind	127	59	<0.50	215.25**
Tornado	30	59	1.97	50.85
Temperature Extremes	0	16	*	*
Wildfire	784	21	<0.50	3,733.33**
Winter Weather (Snow & Ice)	12	59	4.92	20.34

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Newberry County has a higher probability of loss-producing tornado and winter weather events, and is slightly above the statewide average for drought and hail. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Thunderstorms, wind, and flooding are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

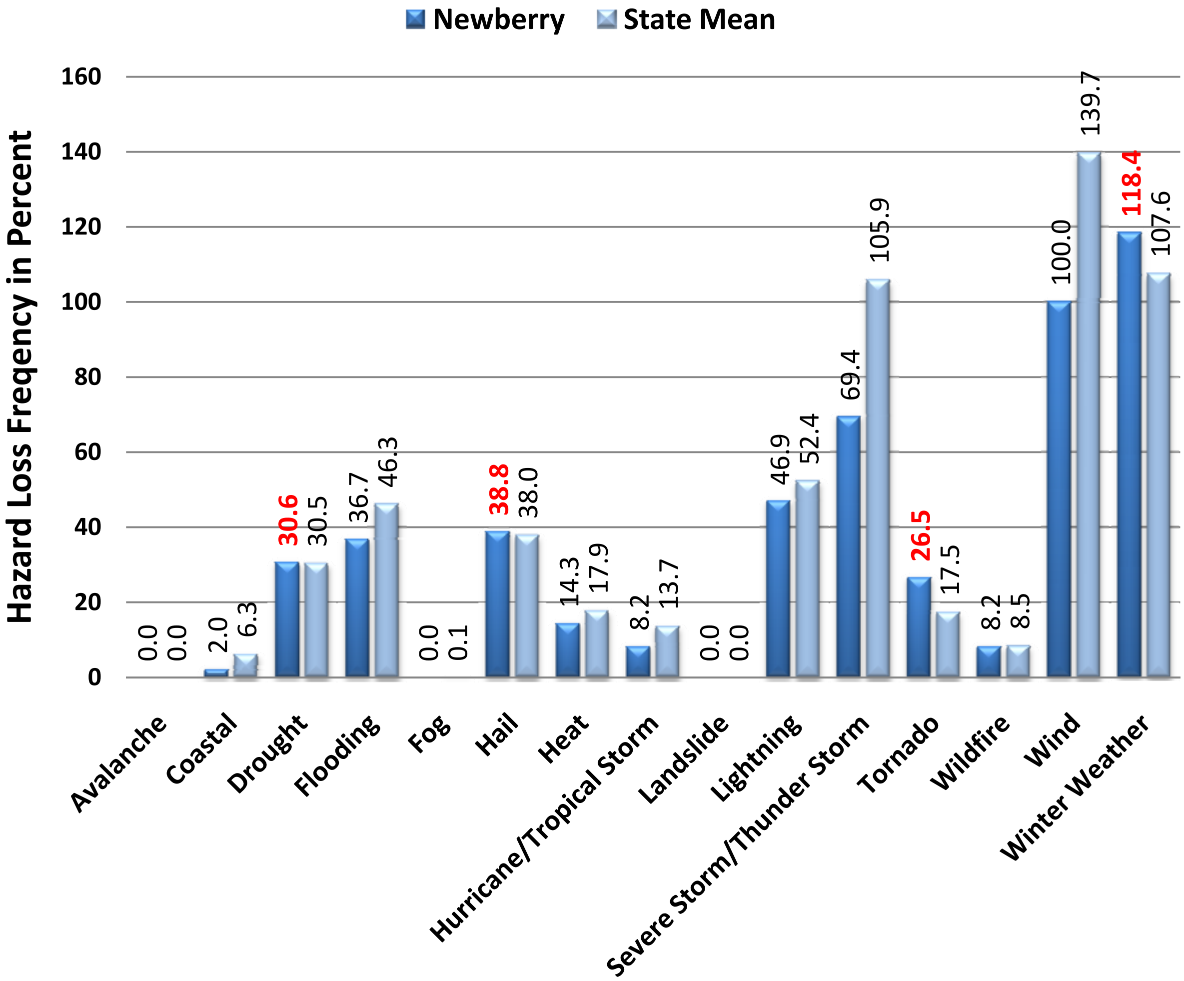


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Newberry County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Newberry County exceed $63 million, and are largely due to winter weather, drought, heat, tornadoes, and hail. While significant for the county, these cumulative losses represent less than one percent of the state's total overall, but 7.6% of the state's total damages related to hail.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$1,365,708	0.88%
Hail	$7,812,970	7.58%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$975,831	0.02%
Lightning	$459,167	0.87%
Severe Storm/ Thunder Storm	$759,185	0.36%
Tornado	$10,015,297	4.23%
Wildfire	$334,042	2.09%
Wind	$668,237	0.46%
Winter Weather	$15,663,866	1.74%
Newberry - Total	**$63,405,900**	**0.66%**

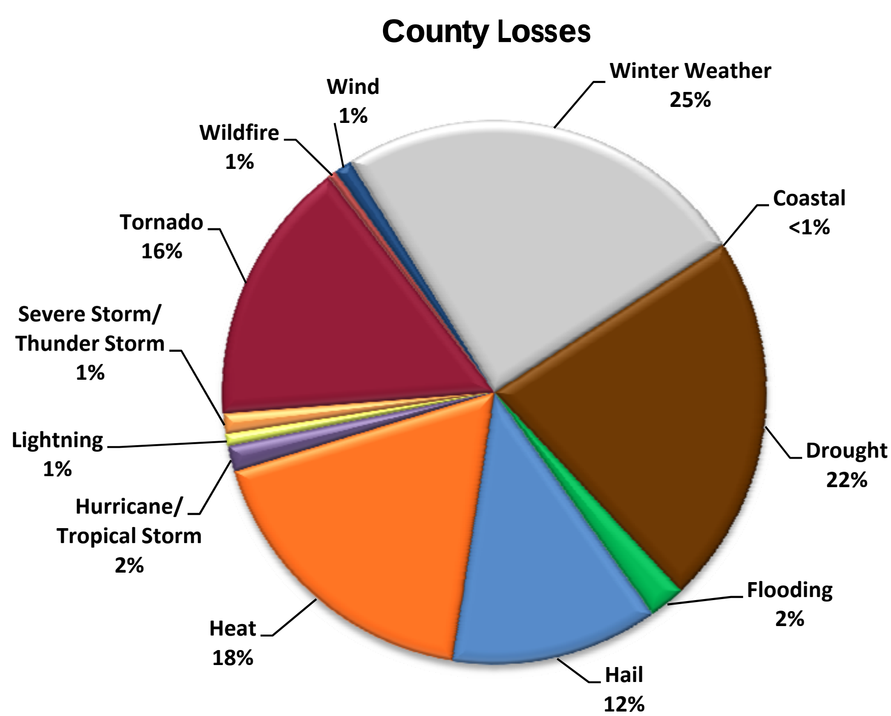
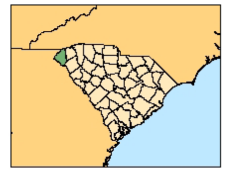


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Newberry County, SC.

OCONEE COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Oconee County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Winter weather produced the greatest monetary damage in the county. Wildfires, winter weather, thunderstorms, hail, and hazardous material incidents are some of the prominent hazards that regularly affect the county based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Oconee County, most of the census tracts exhibit moderate to limited levels of social vulnerability. Figure 1 provides maps of the Oconee County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

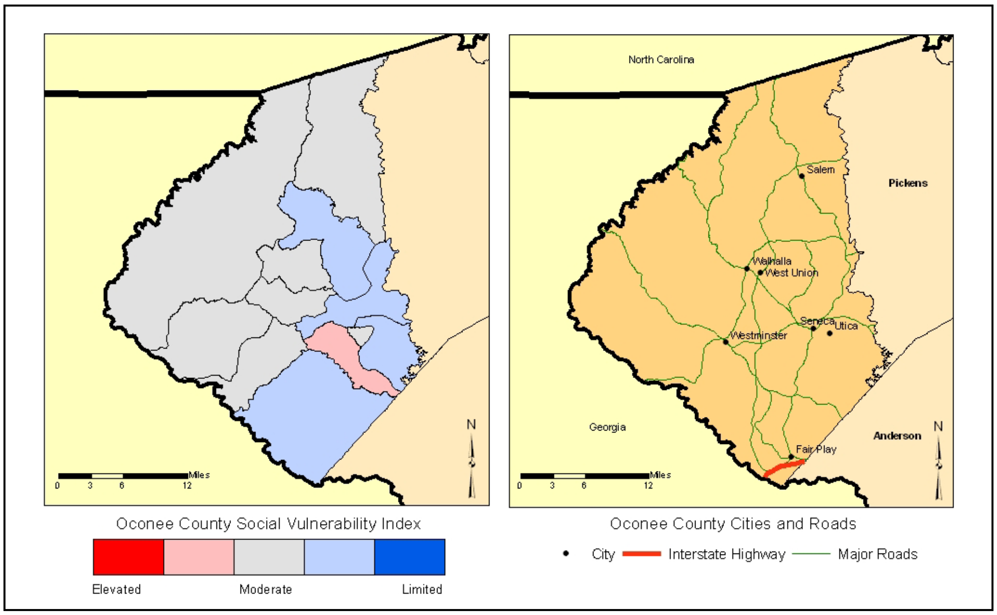


FIGURE 1. The Social Vulnerability for Oconee County, SC by US Census tracts and a general reference map of Oconee County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.

Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.

Hazard – the potential threat to humans as well as the impact of an event on society and the environment.

Recurrence – a calculated number that examines the expected time interval between events based on the historic record.

Risk – the likelihood or probability of occurrence of a hazard or adverse event.

Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Oconee County are wildfire, thunderstorms, hail, hazardous material accidents, and winter weather. Earthquakes and hurricanes/tropical storms are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Oconee County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	1	158	158.00	0.63
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	33	59	1.79	55.93
Flood	22	59	2.68	37.29
Fog	5	12	2.40	41.67
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	13	310	23.85	4.19
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	178	22	<0.50	809.09**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	11,888	10	<0.50	118,880.00**
Severe Thunderstorm Events				
Funnel Cloud	1	16	16.00	6.25
Hail	111	59	0.53	188.14**
Heavy Precipitation	6	15	2.50	40.00
Lightning	8	16	2.00	50.00
Thunderstorm & Wind	194	59	<0.50	328.81**
Tornado	22	59	2.68	37.29
Temperature Extremes	7	16	2.29	43.75
Wildfire	864	21	<0.50	4,114.29**
Winter Weather (Snow & Ice)	71	59	0.83	120.34**

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)

** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year

\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Oconee County has a higher probability of loss-producing wind and winter weather events, thunderstorms, lightning, flooding, and tornado events. The county is slightly above the state average for drought, and hail. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Hurricane and tropical storms are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

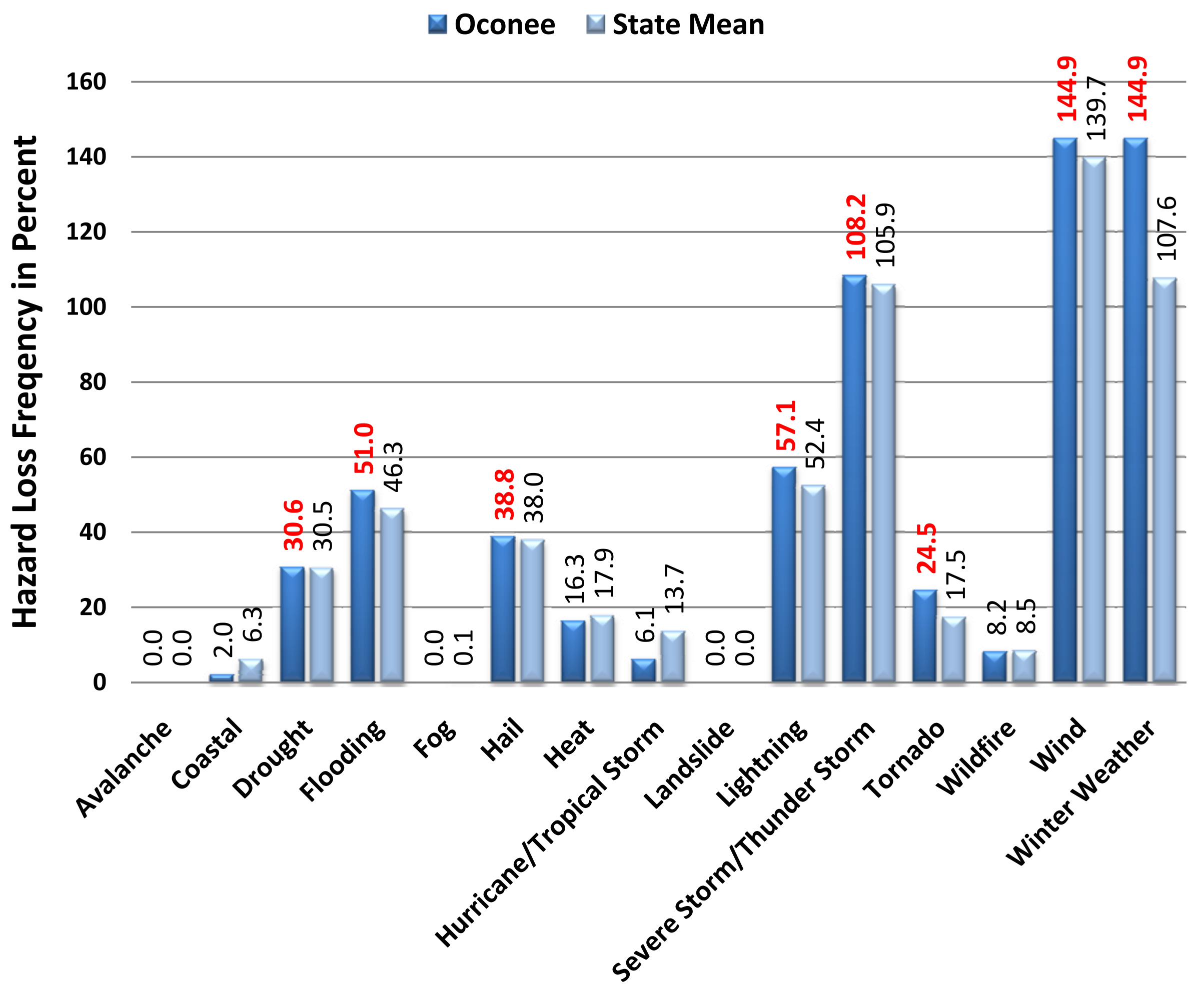


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Oconee County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Oconee County exceed $71 million, and are largely due to winter weather, followed by drought and heat. While significant for the county, these cumulative losses represent less than one percent of the state's overall total.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$5,223,521	3.37%
Hail	$1,033,976	1.00%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$329,868	0.01%
Lightning	$1,192,759	2.27%
Severe Storm/ Thunder Storm	$5,061,967	2.40%
Tornado	$935,140	0.40%
Wildfire	$334,042	2.09%
Wind	$1,169,192	0.80%
Winter Weather	$31,270,123	3.47%
Oconee - Total	**$71,902,187**	**0.75%**

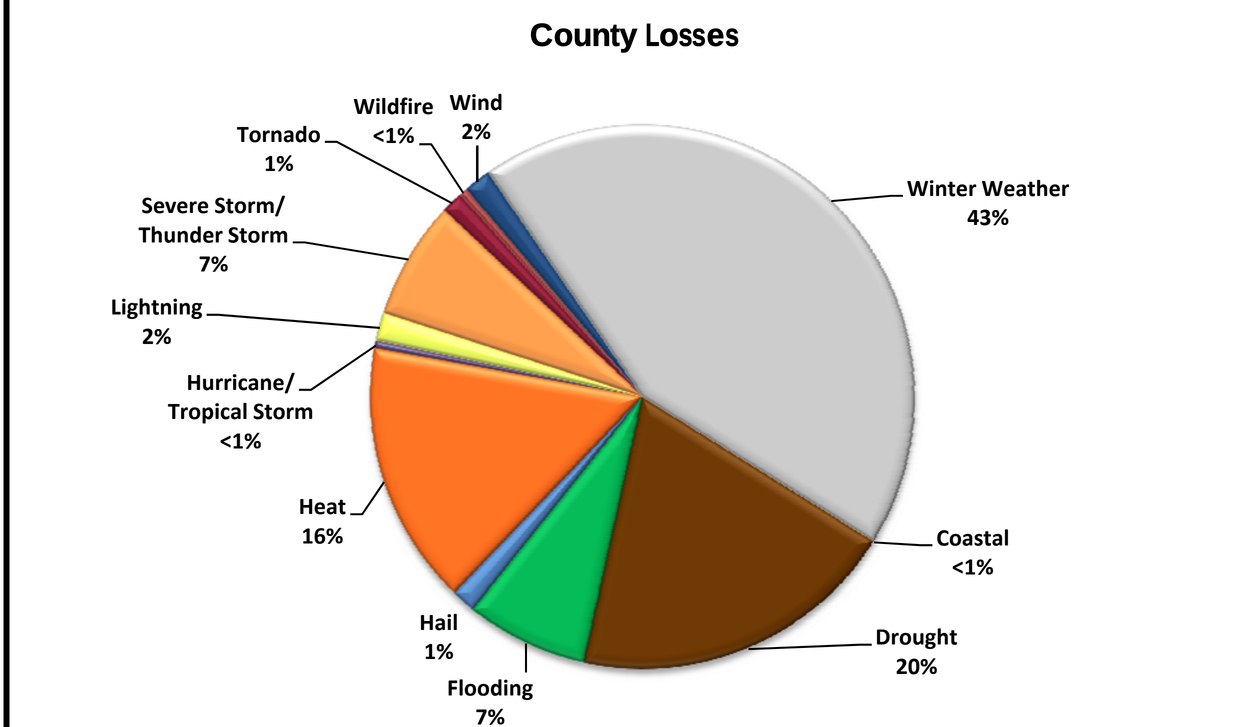
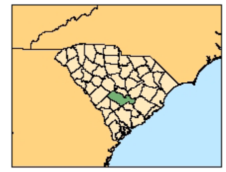


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Oconee County, SC.

ORANGEBURG COUNTY, SC



Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008

I. Summary

Orangeburg County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Hurricane/tropical storms produce the most monetary damage; however the recurrence interval is 6 years making it a relatively infrequent event. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Orangeburg County, the census tracts exhibit moderate to moderately high levels of social vulnerability. Census tracts within the city of Orangeburg have the highest SoVI scores, illustrating elevated levels of social vulnerability. Figure 1 provides maps of the Orangeburg County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

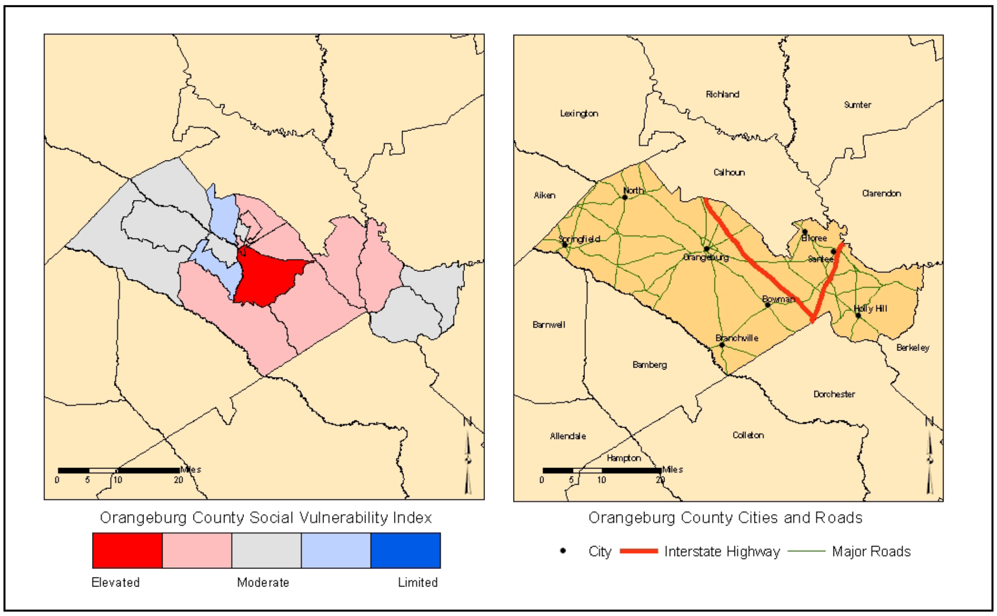


FIGURE 1. The Social Vulnerability for Orangeburg County, SC by US Census tracts and a general reference map of Orangeburg County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.

Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.

Hazard – the potential threat to humans as well as the impact of an event on society and the environment.

Recurrence – a calculated number that examines the expected time interval between events based on the historic record.

Risk – the likelihood or probability of occurrence of a hazard or adverse event.

Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Orangeburg County are hazardous material accidents, severe thunderstorms and wind, hail, and wildfires. Droughts, earthquakes, and winter weather are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Orangeburg County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	26	158	6.08	16.46
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59.00	1.69
Flood	8	59	7.38	13.56
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	20	310	15.50	6.45
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	374	22	<0.50	1,700.00**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	21,793	10	<0.50	217,930.00**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	134	59	<0.50	227.12**
Heavy Precipitation	1	15	15.00	6.67
Lightning	9	16	1.78	56.25
Thunderstorm & Wind	233	59	<0.50	394.92**
Tornado	47	59	1.26	79.66
Temperature Extremes	1	16	16.00	6.25
Wildfire	4,703	21	<0.50	22,395.24**
Winter Weather (Snow & Ice)	4	59	14.75	6.78

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)

** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year

\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Orangeburg County has a higher probability of loss-producing lightning and tornado events, and is around the average for drought and flooding. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Winter weather is well below the state mean indicating that this hazard has historically produced fewer losses for the county when compared to the state as a whole.

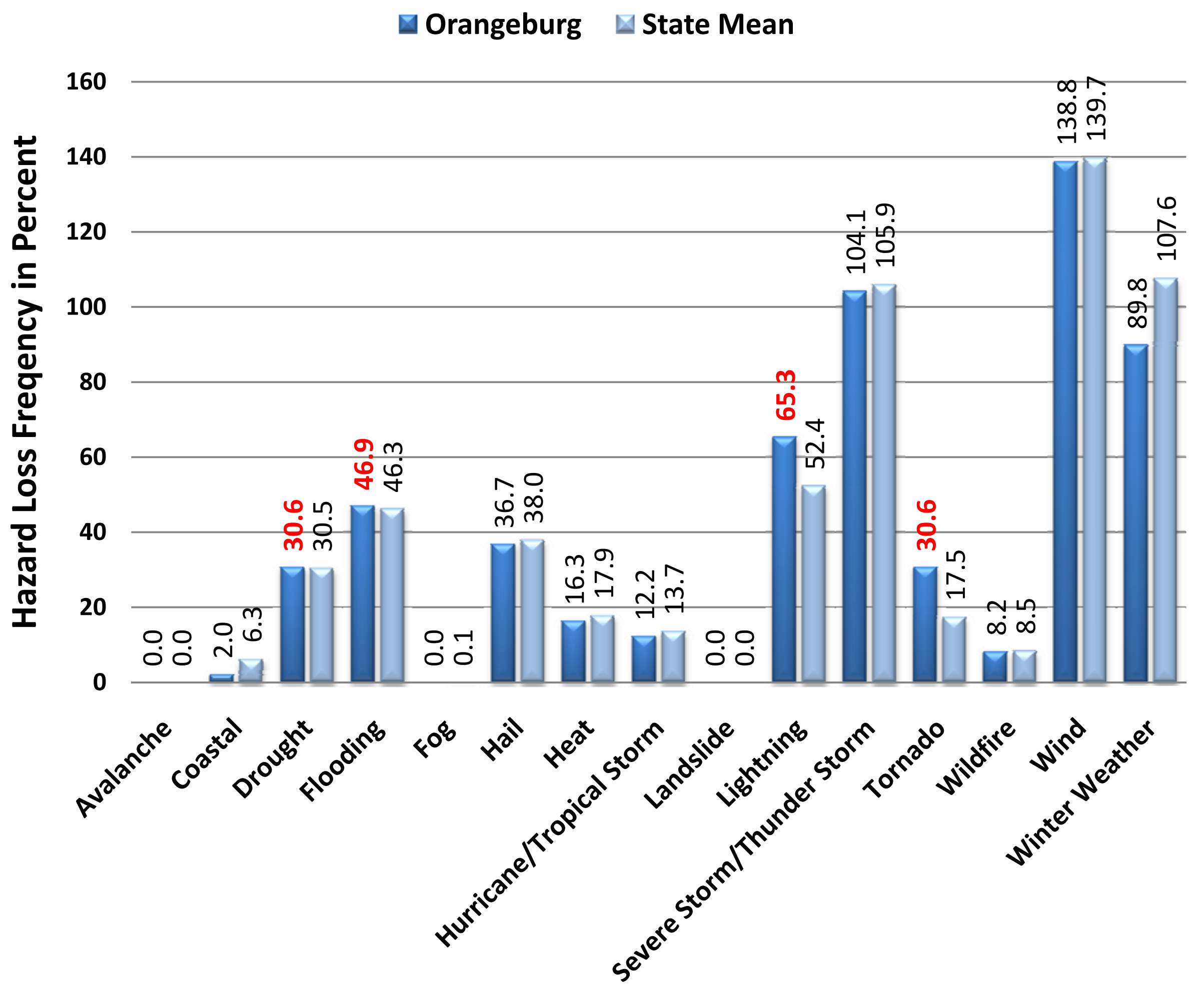


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Orangeburg County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Orangeburg County exceed $67 million, and are largely due to hurricanes and tropical storms, followed by winter weather, drought, and heat. Hurricane/tropical storm represented 27% of the losses in Orangeburg County. While significant for the county, these cumulative losses represent less than one percent of the state's overall total.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$679,274	0.44%
Hail	$471,009	0.46%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$18,314,866	0.33%
Lightning	$1,220,358	2.32%
Severe Storm/ Thunder Storm	$1,679,288	0.79%
Tornado	$3,192,501	1.35%
Wildfire	$334,042	2.09%
Wind	$1,758,209	1.21%
Winter Weather	$14,542,313	1.61%
Orangeburg - Total	**$67,543,458**	**0.71%**

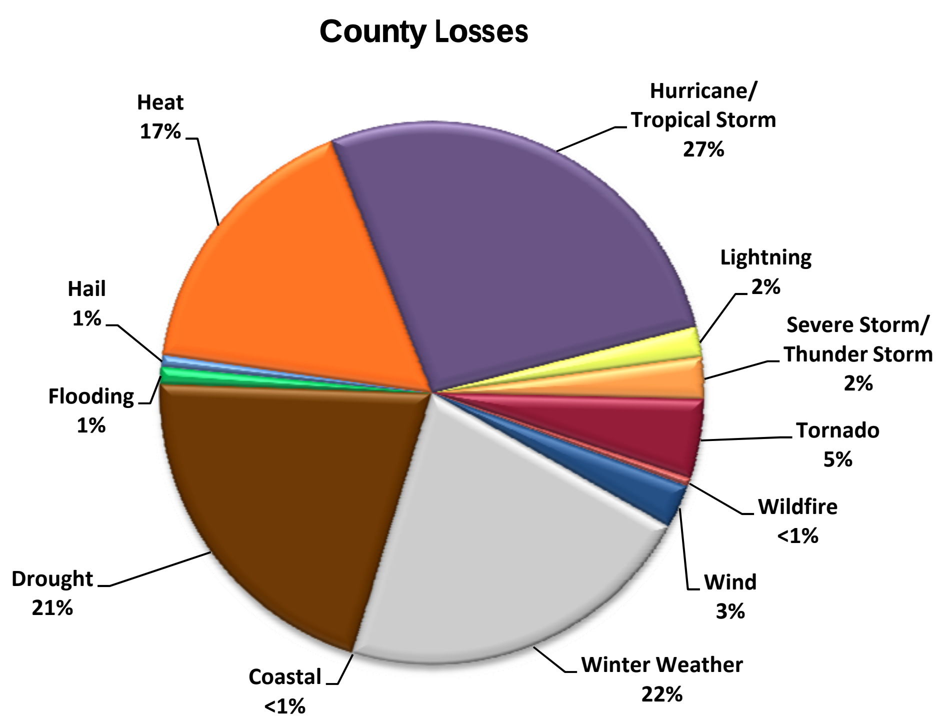
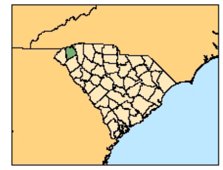


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Orangeburg County, SC.

PICKENS COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Pickens County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Winter weather produces the greatest monetary damage and is among the county's most frequent hazards. Wildfires, thunderstorms, hail, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Pickens County, most of the census tracts exhibit moderately limited levels of social vulnerability. Figure 1 provides maps of the Pickens County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

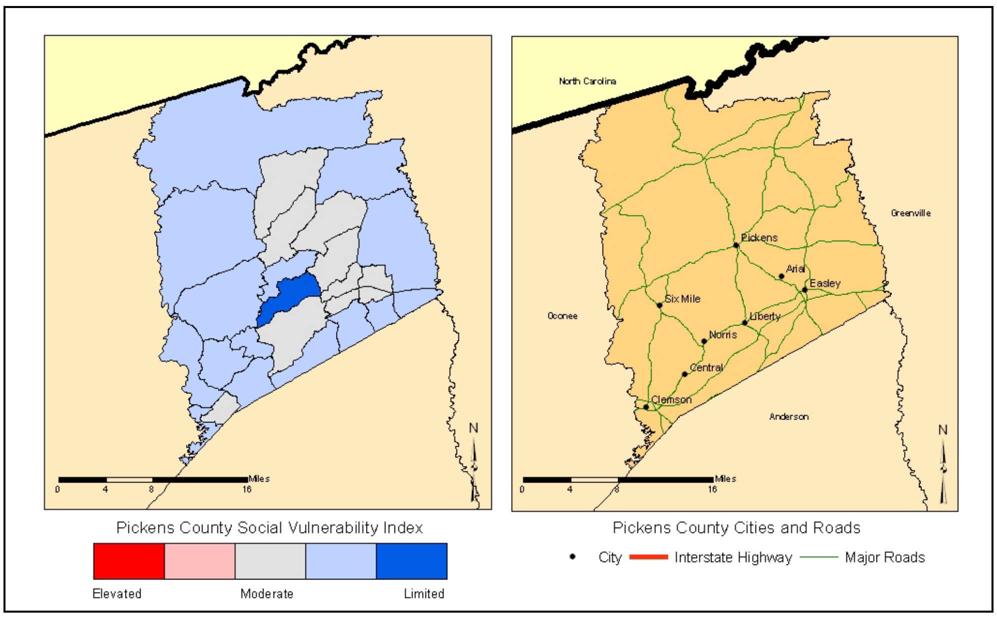


FIGURE 1. The Social Vulnerability for Pickens County, SC by US Census tracts and a general reference map of Pickens County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.

Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.

Hazard – the potential threat to humans as well as the impact of an event on society and the environment.

Recurrence – a calculated number that examines the expected time interval between events based on the historic record.

Risk – the likelihood or probability of occurrence of a hazard or adverse event.

Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Pickens County are wildfires, hazardous material accidents, severe thunderstorms and wind, hail, and winter weather. Earthquakes and hurricanes/tropical storms are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Pickens County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	2	158	79.00	1.27
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	33	59	1.79	55.93
Flood	39	59	1.51	66.10
Fog	6	12	2.00	50.00
Geophysical Events				
Avalanche	0	49	*	**
Earthquake	5	310	62.00	1.61
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	132	22	<0.50	600.00**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	18,747	10	<0.50	187,470.00**
Severe Thunderstorm Events				
Funnel Cloud	1	16	16.00	6.25
Hail	90	59	0.656	152.54**
Heavy Precipitation	8	15	1.88	53.33
Lightning	6	16	2.67	37.50
Thunderstorm & Wind	199	59	<0.50	337.29**
Tornado	22	59	2.68	37.29
Temperature Extremes	4	16	4.00	25
Wildfire	1,168	21	<0.50	5,561.90**
Winter Weather (Snow & Ice)	68	59	0.87	115.25**

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Pickens County has a higher probability of loss-producing winter weather, wind, thunderstorm, tornado, hail, and flooding events. The county is slightly above the state average for drought and heat. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. The remaining hazards are below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

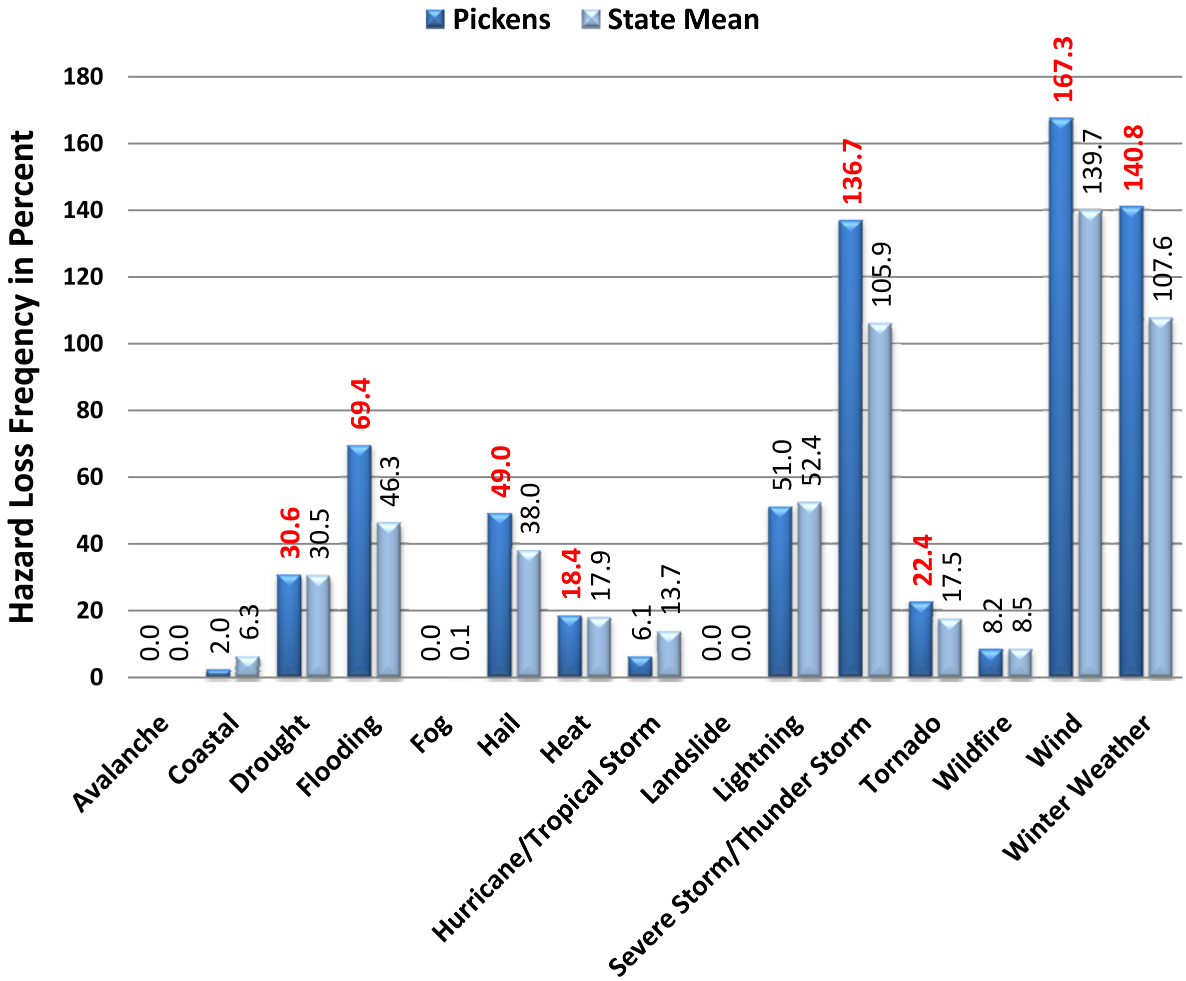


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Pickens County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Pickens County exceed $83 million, and are largely due to winter weather, followed by drought, flooding, and heat. While significant for the county, these cumulative losses represent less than one percent of the state's overall total. Flood losses in Oconee account for 8% of the state's total losses from flood hazards.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$12,710,769	8.21%
Hail	$775,669	0.75%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$329,868	0.01%
Lightning	$305,331	0.58%
Severe Storm/ Thunder Storm	$5,565,288	2.63%
Tornado	$5,301,152	2.24%
Wildfire	$334,042	2.09%
Wind	$1,835,455	1.26%
Winter Weather	$31,270,123	3.47%
Pickens - Total	**$83,779,296**	**0.88%**

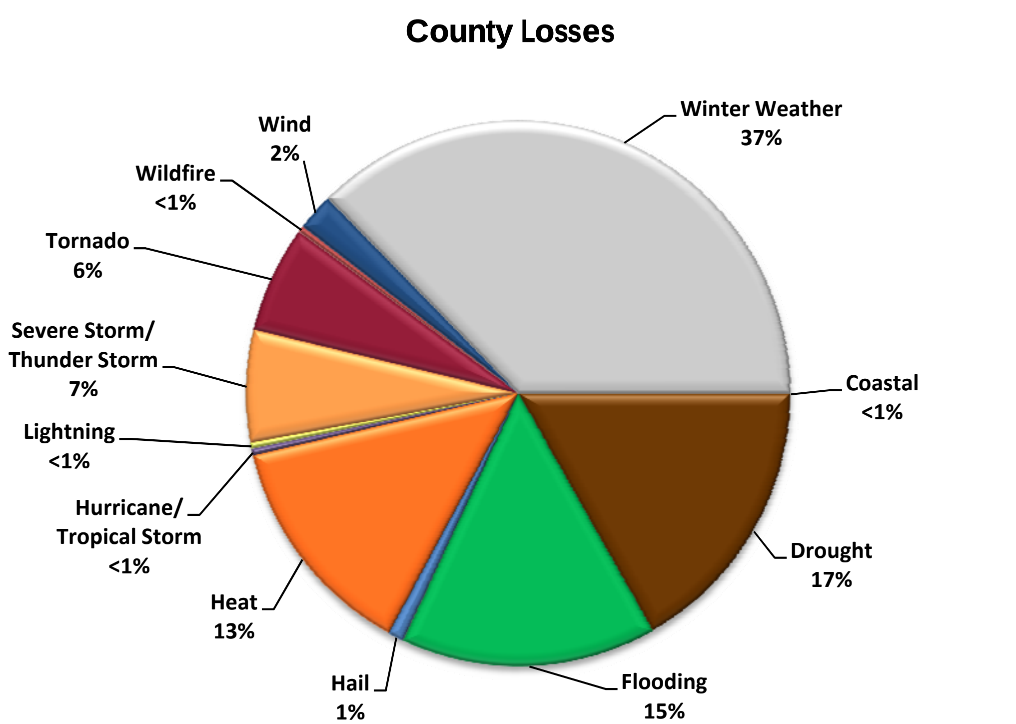
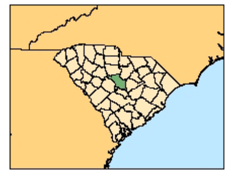


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Pickens County, SC.

RICHLAND COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Richland County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Hurricane/tropical storms produce the greatest monetary damage; however, the recurrence interval is 9.3 years, making it a relatively rare event. More frequently occurring events such as tornadoes produce nearly as much damage as hurricanes/tropical storms within the county. Wildfires, thunderstorms, hail, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Richland County, most of the census tracts exhibit moderate levels of social vulnerability. Concentrations of high social vulnerability are in Columbia, while low levels of social vulnerability are found in the suburban areas northeast, northwest, and southeast of the city. Figure 1 provides maps of the Richland County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

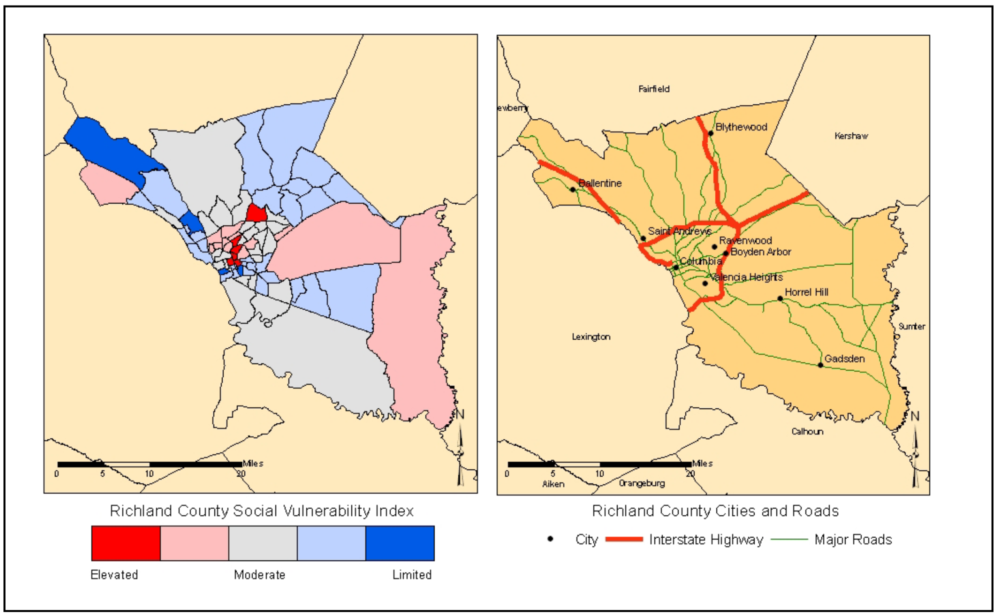


FIGURE 1. The Social Vulnerability for Richland County, SC by US Census tracts and a general reference map of Richland County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.

Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.

Hazard – the potential threat to humans as well as the impact of an event on society and the environment.

Recurrence – a calculated number that examines the expected time interval between events based on the historic record.

Risk – the likelihood or probability of occurrence of a hazard or adverse event.

Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Richland County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Droughts and landslides have the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Richland County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	17	158	9.29	10.76
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59.00	1.69
Flood	23	59	2.57	38.98
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	18	310	17.22	5.81
Landslide	1	49	49.00	2.04
Human-Induced Events				
Civil Disturbance		-	-	-
Hazardous Materials (Hazmat)	328	22	<0.50	1,490.91**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	94,120	10	<0.50	941,200**
Severe Thunderstorm Events				
Funnel Cloud	2	16	8.00	12.50
Hail	147	59	<0.50	249.15**
Heavy Precipitation	1	15	15.00	6.67
Lightning	10	16	1.60	62.50
Thunderstorm & Wind	269	59	<0.50	455.93**
Tornado	34	59	1.74	57.63
Temperature Extremes	1	16	16.00	6.25
Wildfire	1,693	21	<0.50	8,061.90**
Winter Weather (Snow & Ice)	6	59	9.83	10.17

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Richland County has a higher probability of loss-producing flooding, hail, landslide, lightning, thunderstorm, heat, and tornado events, and is slightly above the state average for drought. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Wind and winter weather are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

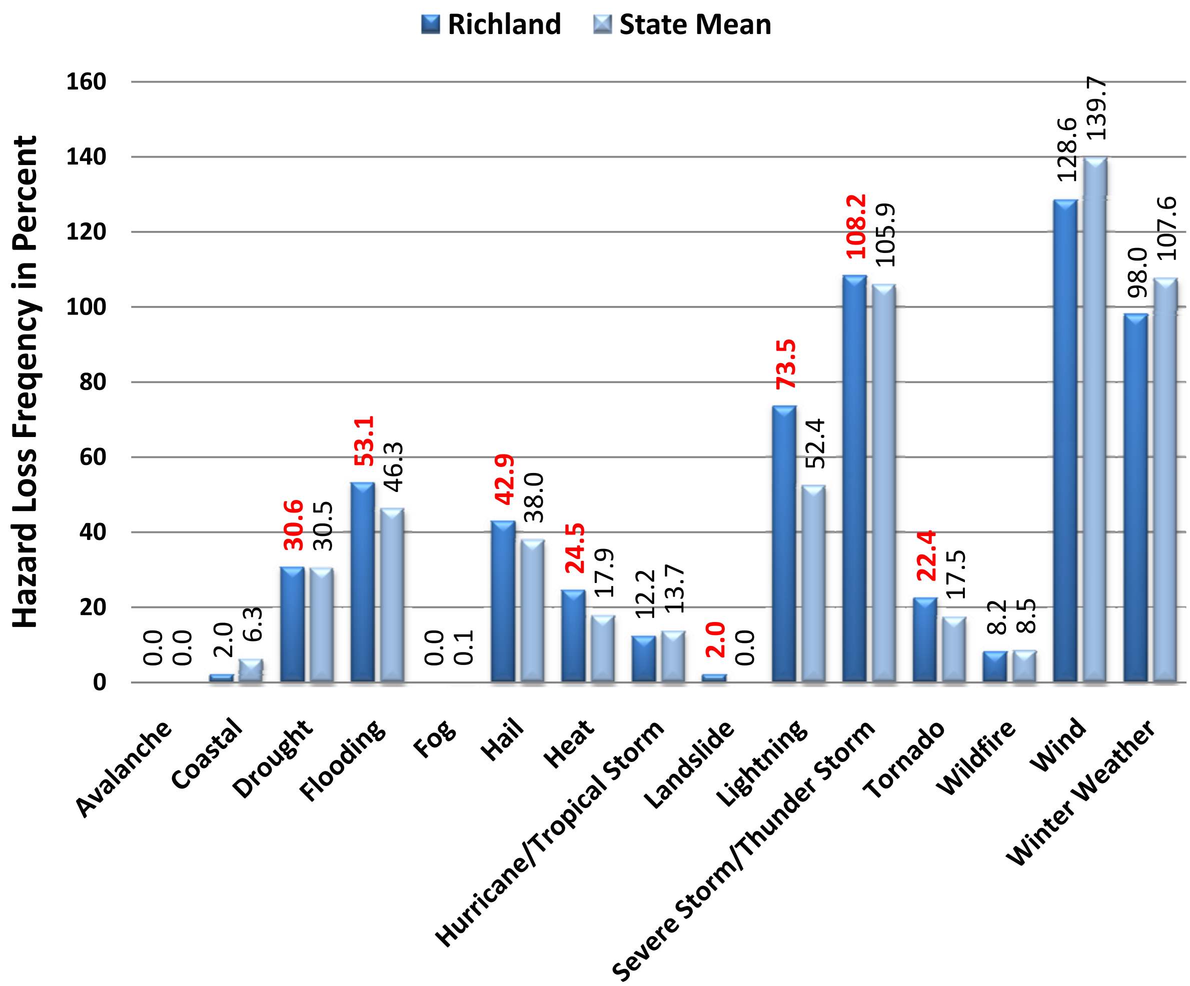


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Richland County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Richland County exceed $91million, and are largely due to a combination of hazards: hurricanes and tropical storms, tornados, winter weather, drought, and heat. While significant for the county, these cumulative losses represent less than one percent of the state's total overall, but 7% of the state's total damages related to lightning and 7% of the state's damages related to tornadoes.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$684,380	0.44%
Hail	$474,144	0.46%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$18,314,866	0.33%
Landslide	$0	0.00%
Lightning	$3,688,835	7.02%
Severe Storm/ Thunder Storm	$6,392,254	3.03%
Tornado	$16,083,528	6.80%
Wildfire	$334,042	2.09%
Wind	$5,945,453	4.08%
Winter Weather	$14,597,406	1.62%
Richland - Total	**$91,866,506**	**0.96%**

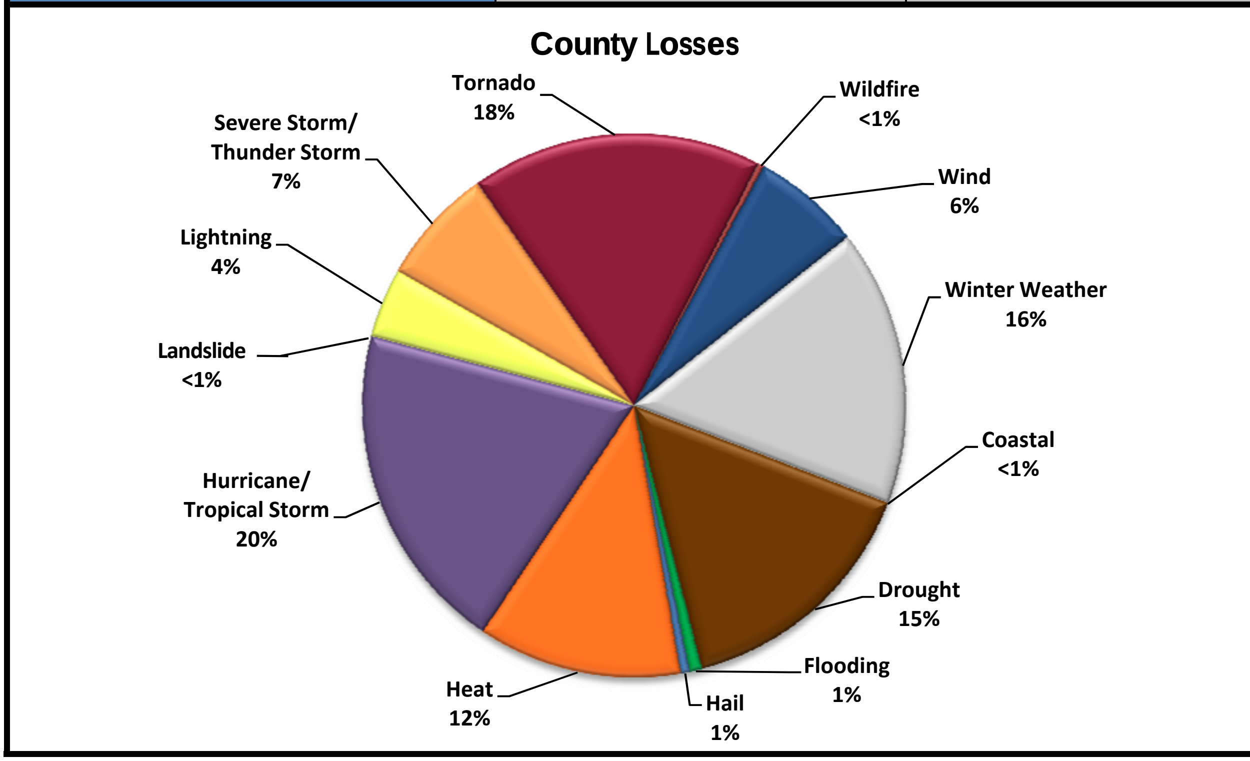
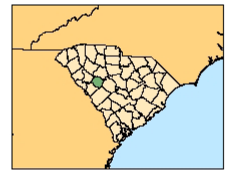


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Richland County, SC.

SALUDA COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Saluda County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Winter weather produces the greatest monetary damage; however, the recurrence interval is 8.4 years, making it a relatively rare event. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

All census tracts within Saluda County exhibit moderate to elevated levels of social vulnerability. Figure 1 provides maps of the Saluda County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

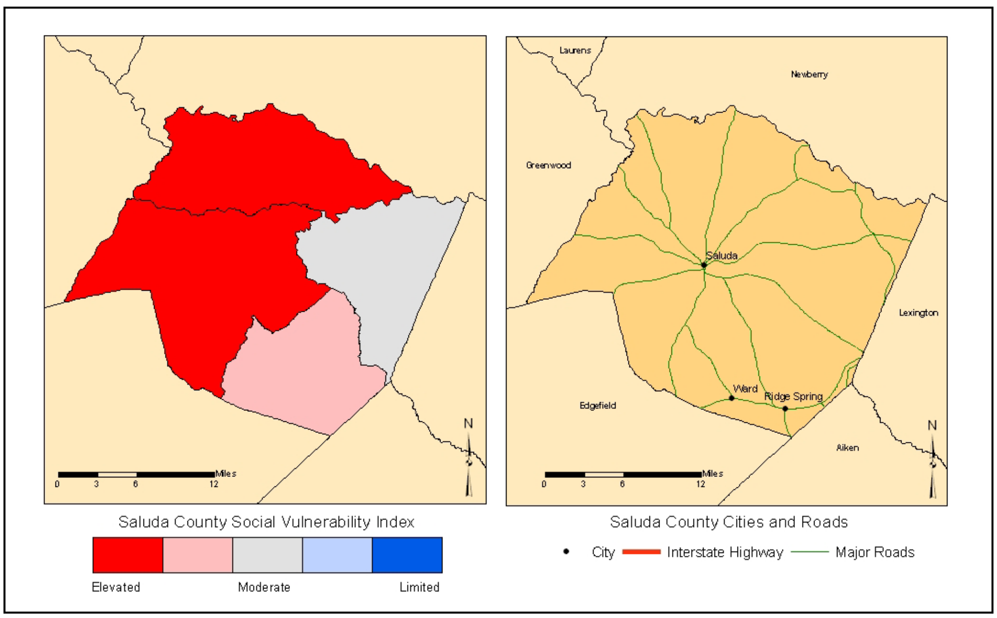


FIGURE 1. The Social Vulnerability for Saluda County, SC by US Census tracts and a general reference map of Saluda County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.

Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.

Hazard – the potential threat to humans as well as the impact of an event on society and the environment.

Recurrence – a calculated number that examines the expected time interval between events based on the historic record.

Risk – the likelihood or probability of occurrence of a hazard or adverse event.

Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Saluda County are hazardous material accidents, severe thunderstorms and wind, and wildfires. Earthquakes, drought, and hurricanes/tropical storms have the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Saluda County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	4	158	39.05	2.53
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	59.00	1.69
Flood	4	59	14.75	6.78
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	2	310	155.00	0.65
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	87	22	<0.50	395.45**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	2,956	10	<0.50	29,560.00**
Severe Thunderstorm Events				
Funnel Cloud	1	16	16.00	6.25
Hail	47	59	1.26	79.66
Heavy Precipitation	0	15	*	*
Lightning	0	16	*	*
Thunderstorm & Wind	90	59	0.66	152.54**
Tornado	10	59	5.90	16.95
Temperature Extremes	0	16	*	*
Wildfire	702	21	<0.50	3,342.86**
Winter Weather (Snow & Ice)	7	59	8.43	11.86

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Saluda County has the same probability of loss-producing drought events, but is below the state mean for all other hazards. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Thunderstorms and wind are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

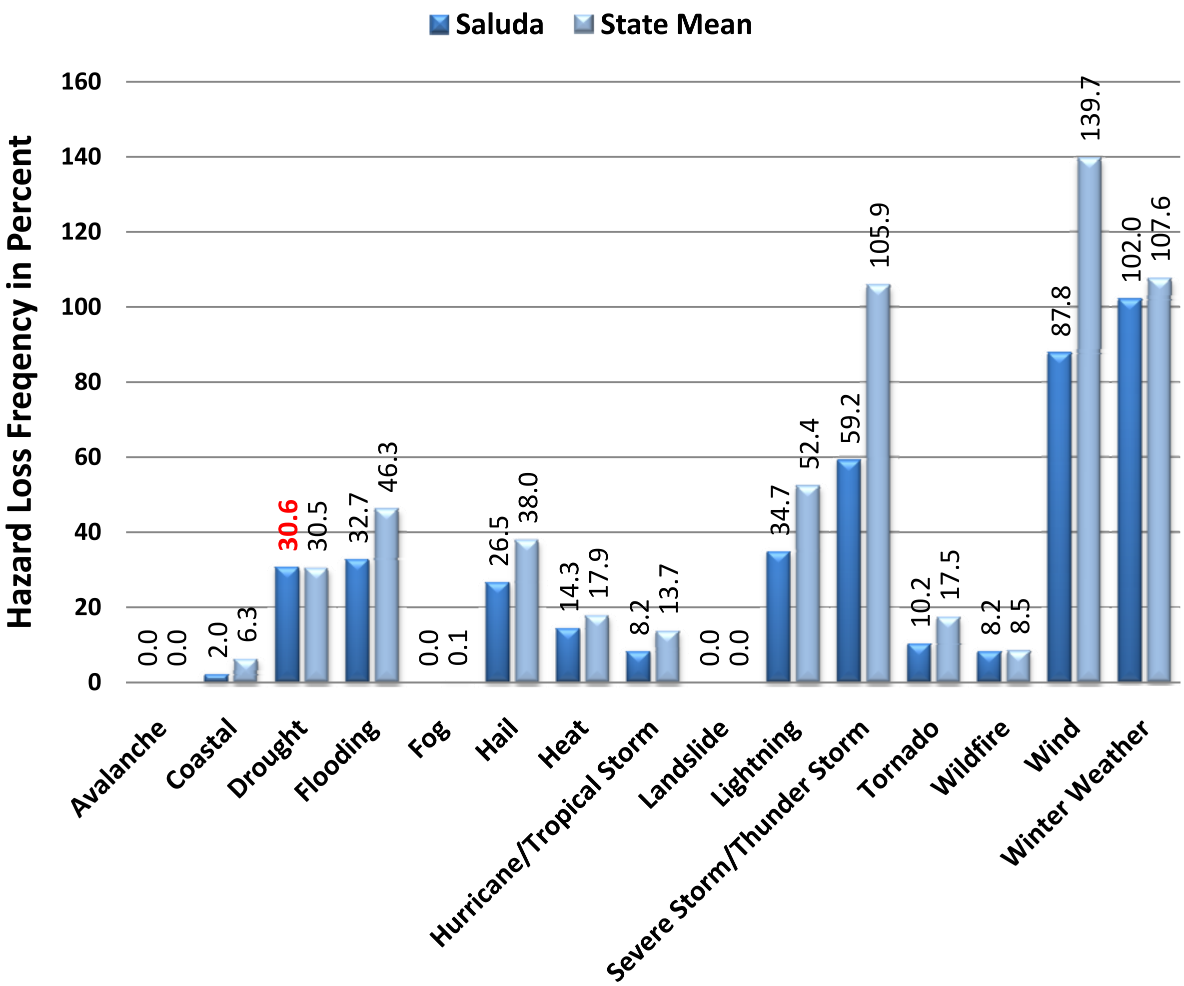


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Saluda County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Saluda County exceed $50 million, and are largely due to winter weather drought, and heat. While significant for the county, these cumulative losses represent less than one percent of the state's total overall, but 5% of the state's total damages related to hail events.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$354,764	0.23%
Hail	$5,442,621	5.28%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$975,831	0.02%
Lightning	$273,696	0.52%
Severe Storm/ Thunder Storm	$589,547	0.28%
Tornado	$1,612,882	0.68%
Wildfire	$334,042	2.09%
Wind	$455,255	0.31%
Winter Weather	$15,300,169	1.70%
Saluda - Total	**$50,690,405**	**0.53%**

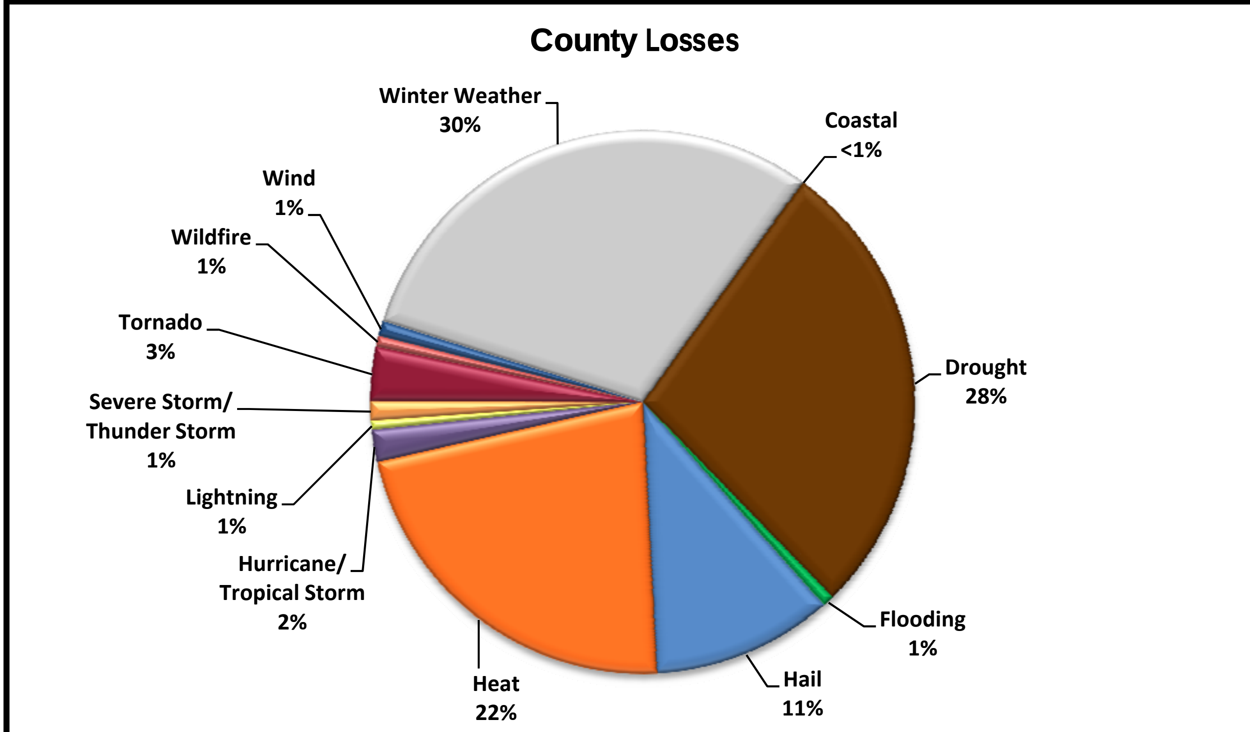
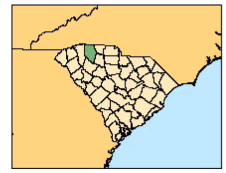


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Saluda County, SC.

SPARTANBURG COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Spartanburg County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Winter weather produces the greatest monetary damage, followed by flooding and hail. All of these hazards have a recurrence interval of less than year. Other frequently occurring hazards include wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Spartanburg County, most of the census tracts exhibit moderate to limited levels of social vulnerability. The exception are those census tracts within the city of Spartanburg and surrounding areas, which have high SoVI scores, thus elevated levels of social vulnerability. Figure 1 provides maps of the Spartanburg County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

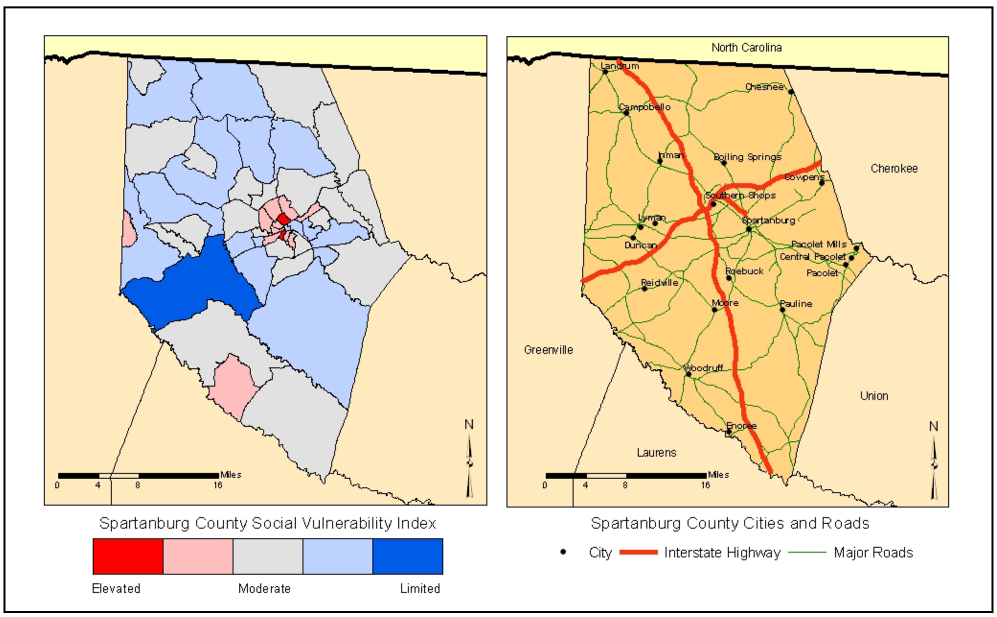


FIGURE 1. The Social Vulnerability for Spartanburg County, SC by US Census tracts and a general reference map of Spartanburg County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Spartanburg County are wildfires, hazardous material accidents, severe thunderstorms and wind , flooding, lightning, and hail. Earthquakes, hurricanes/tropical storms are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Spartanburg County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	4	158	39.50	2.53
Ocean & Lake Surf[b]	2	16	8.00	12.50
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	33	59	1.79	55.93
Flood	62	59	0.95	105.08**
Fog	4	12	3.00	33.33
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	4	310	77.50	1.29
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	474	22	<0.50	2,154.55**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	59,473	10	<0.50	594,730.00**
Severe Thunderstorm Events				
Funnel Cloud	5	16	3.20	31.25
Hail	199	59	<0.50	337.29**
Heavy Precipitation	11	15	1.36	73.33
Lightning	32	16	0.50	200.00**
Thunderstorm & Wind	354	59	<0.50	600.00**
Tornado	26	59	2.27	44.07
Temperature Extremes	9	16	1.78	56.25
Wildfire	1,086	21	<0.50	5,171.43**
Winter Weather (Snow & Ice)	54	59	1.09	91.53

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)

** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year

\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Spartanburg County has a higher probability of loss-producing flooding, hail, lightning, thunderstorm, tornado, wind, and winter weather events. It has slightly more than the state average for drought. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. The remaining hazards are below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

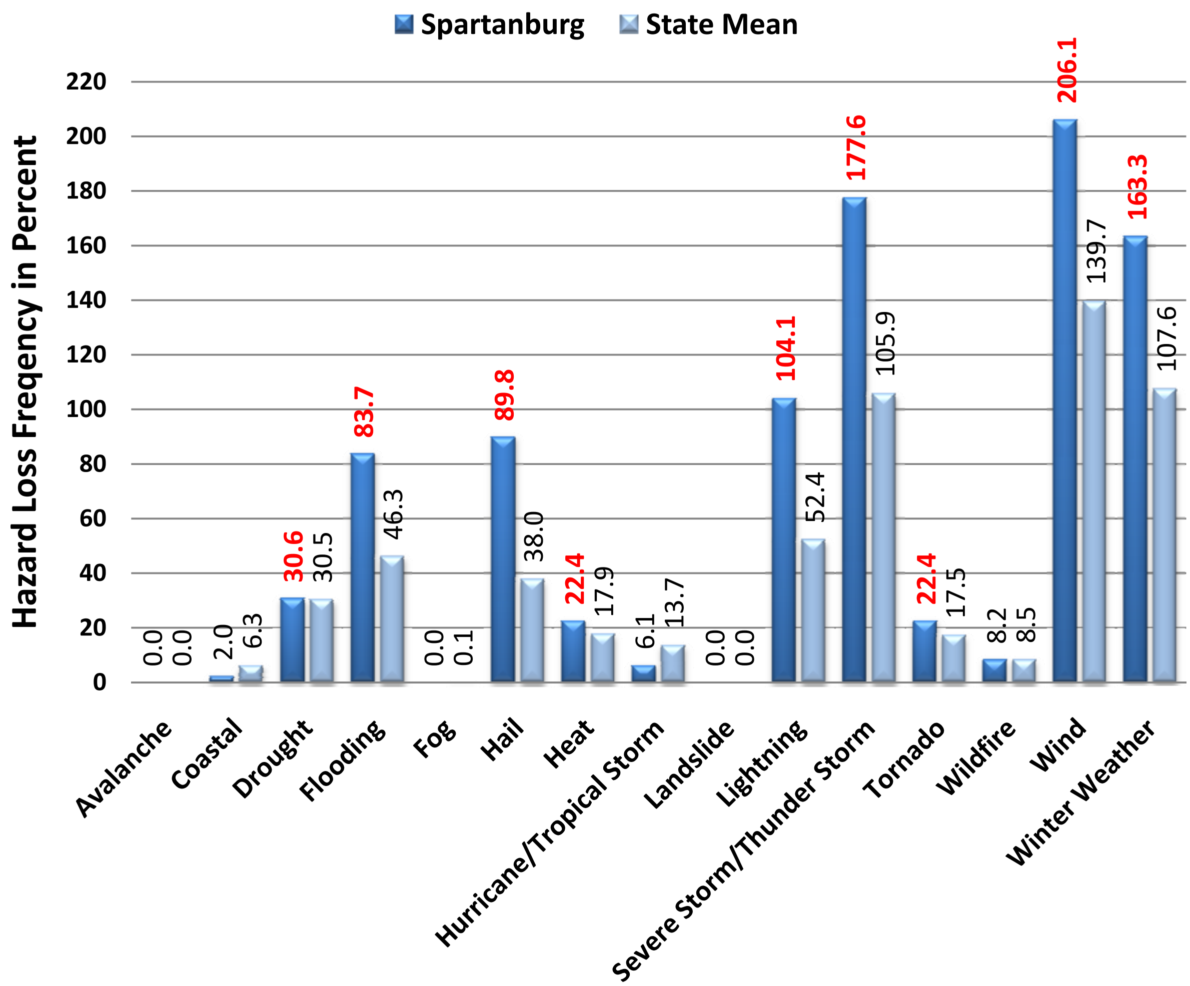


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Spartanburg County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Spartanburg County exceed $133 million, and are largely due to winter weather followed by flooding and hail. While significant for the county, these cumulative losses represent 1.4% of the state's overall total. However, the county represents nearly 20% of the state's losses due to hail, and 13% of the state's losses from flooding.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$20,403,460	13.18%
Hail	$20,493,578	19.88%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$329,868	0.01%
Lightning	$3,246,147	6.18%
Severe Storm/ Thunder Storm	$11,598,103	5.49%
Tornado	$4,012,490	1.70%
Wildfire	$334,042	2.09%
Wind	$7,111,775	4.88%
Winter Weather	$38,067,948	4.23%
Spartanburg - Total	**$133,613,382**	**1.45%**

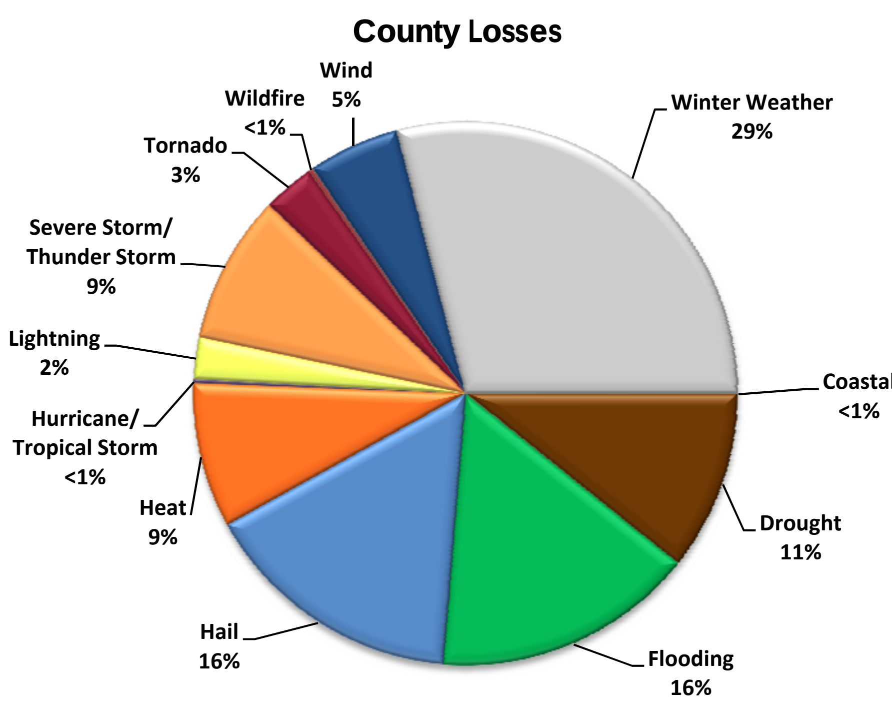
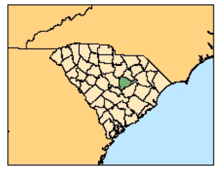


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Spartanburg County, SC.

SUMTER COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



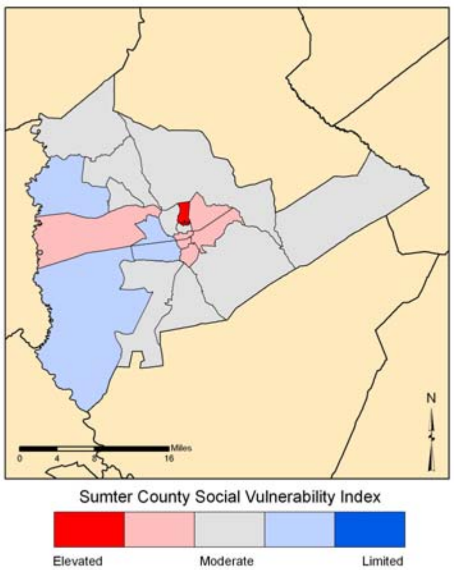
I. Summary

Sumter County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Hurricane/tropical storms produce the greatest monetary damage; however, the recurrence interval is 10.5 years, making it a relatively rare event. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Sumter County, most of the census tracts exhibit elevated levels of social vulnerability. Census tracts in the city of Sumter have higher SoVI scores than the surrounding areas. Figure 1 provides maps of the Sumter County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.



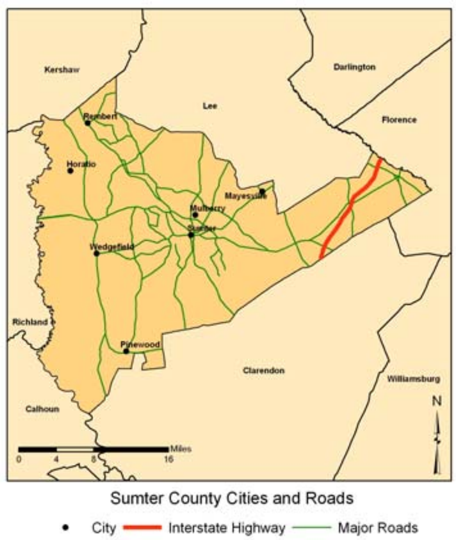


FIGURE 1. The Social Vulnerability for Sumter County, SC by US Census tracts and a general reference map of Sumter County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.

Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.

Hazard – the potential threat to humans as well as the impact of an event on society and the environment.

Recurrence – a calculated number that examines the expected time interval between events based on the historic record.

Risk – the likelihood or probability of occurrence of a hazard or adverse event.

Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Sumter County are hazardous material accidents, severe thunderstorms and wind, hail, and wildfires. Earthquakes and drought are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Sumter County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	15	158	10.53	9.49
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	1	59	5.00	1.69
Flood	6	59	9.83	10.17
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	1	310	310.00	0.32
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	142	22	<0.50	645.45**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	20,920	10	<0.50	209,200.00**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	72	59	0.82	122.03**
Heavy Precipitation	1	15	15.00	6.67
Lightning	1	16	16.00	6.25
Thunderstorm & Wind	161	59	<0.50	272.88**
Tornado	18	59	3.28	30.51
Temperature Extremes	0	16	*	
Wildfire	2,662	21	<0.50	12,676.19**
Winter Weather (Snow & Ice)	6	59	9.83	10.17

[a] Data Sources: National Climatic Data Center (**www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm**); National Geophysical Data Center (**www.ngdc.noaa.gov/hazard/**)
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Sumter County has a lower probability of loss-producing hazards than the state average. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Thunderstorms and wind are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

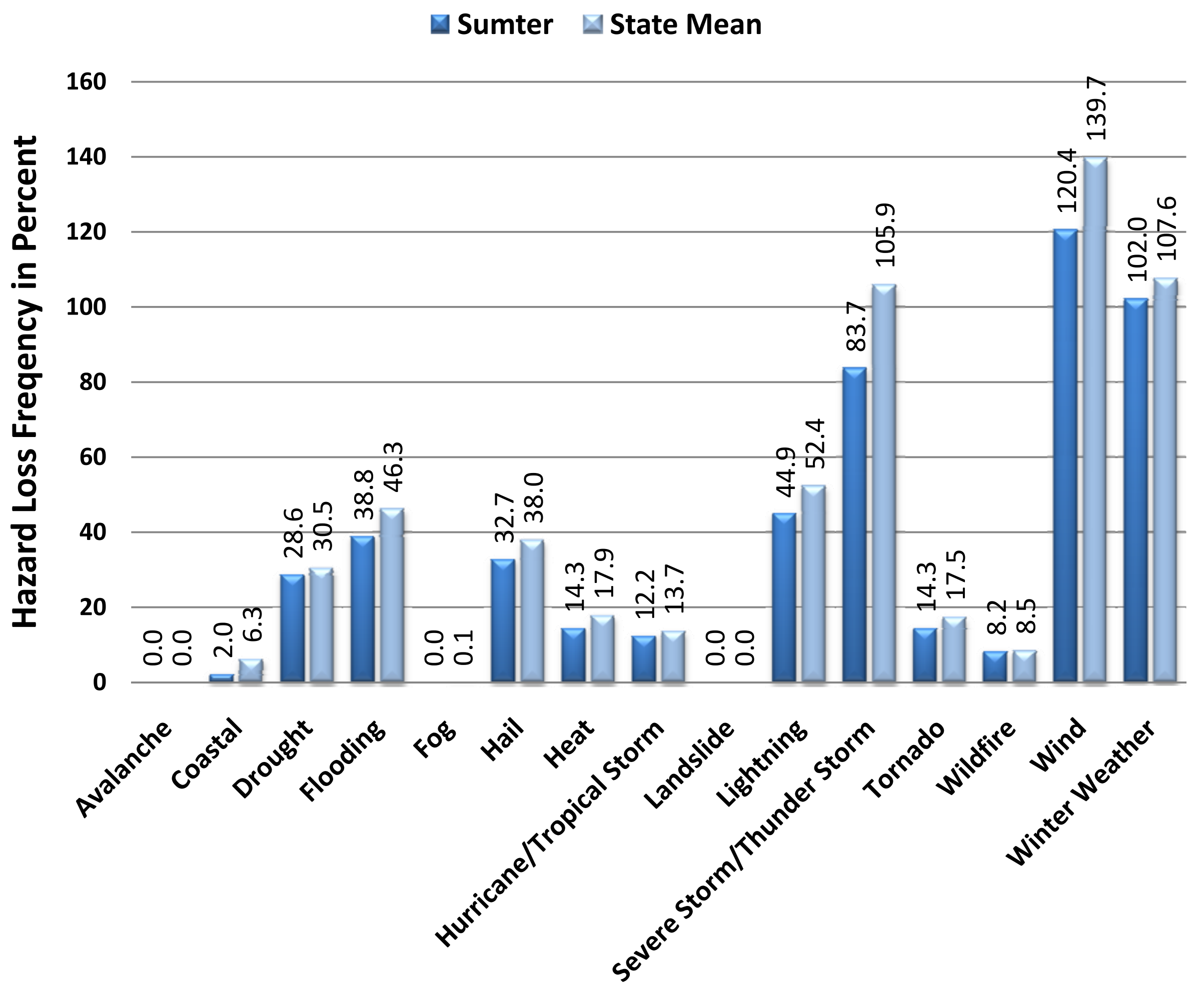


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Sumter County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Sumter County exceed $221million, and are largely due to hurricanes and tropical storms, followed by winter weather, and drought. Hurricane/tropical storm represented 79% of the damage in Sumter County. While significant for the county, these cumulative losses represent only 2.3% of the state's total losses, but >3% of the state's total losses from hurricanes/tropical storms.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,055,942	2.17%
Flooding	$508,801	0.33%
Hail	$293,163	0.28%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$174,314,866	3.16%
Lightning	$620,330	1.18%
Severe Storm/ Thunder Storm	$1,344,115	0.64%
Tornado	$3,030,788	1.28%
Wildfire	$334,042	2.09%
Wind	$1,415,287	0.97%
Winter Weather	$14,655,372	1.63%
Sumter - Total	**$221,865,826**	**2.32%**

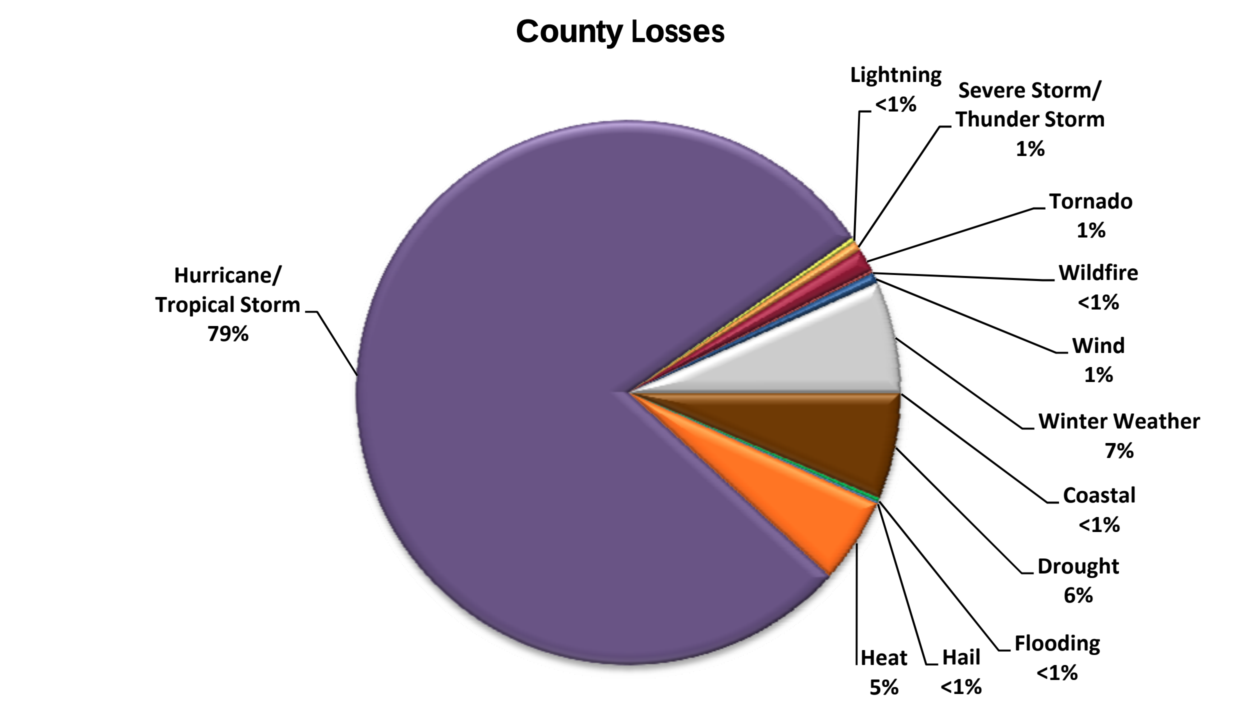
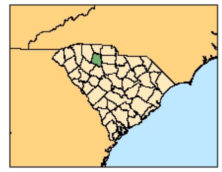


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Sumter County, SC.

UNION COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Union County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents) hazards. Winter weather produced the greatest monetary damage. With a recurrence interval of 2.2 years, this is a frequently occurring hazard. Wildfires, thunderstorms, hail, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Union County, most of the census tracts exhibit moderate level of social vulnerability. Figure 1 provides maps of the Union County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

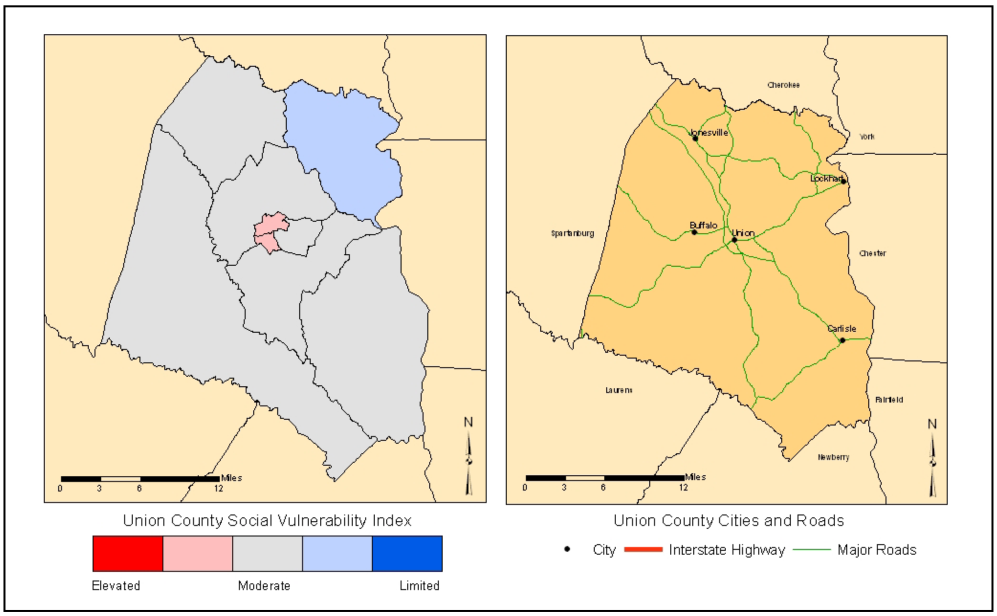


FIGURE 1. The Social Vulnerability for Union County, SC by US Census tracts and a general reference map of Union County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.

Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.

Hazard – the potential threat to humans as well as the impact of an event on society and the environment.

Recurrence – a calculated number that examines the expected time interval between events based on the historic record.

Risk – the likelihood or probability of occurrence of a hazard or adverse event.

Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Union County are wildfires, hazardous material accidents, severe thunderstorms and wind, and hail. Earthquakes and hurricanes/tropical storms are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for Union County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	5	158	31.60	3.16
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	33	59	1.79	55.93
Flood	21	59	2.81	35.59
Fog	3	12	4.00	25.00
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	4	310	77.50	1.29
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	37	22	0.59	168.18**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	4,820	10	<0.50	48,200.00**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	64	59	0.92	108.47**
Heavy Precipitation	0	15	*	*
Lightning	7	16	2.29	43.75
Thunderstorm & Wind	133	59	<0.50	225.42**
Tornado	11	59	5.36	18.64
Temperature Extremes	4	16	4.00	25.00
Wildfire	771	21	<0.50	3,671.43**
Winter Weather (Snow & Ice)	27	59	2.19	45.76

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/

[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)

** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year

\- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, Union County has a higher probability of loss-producing winter weather, wildfires, and lightning events. The county is slightly above the state average for drought. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. Thunderstorms, wind, and tornadoes are well below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

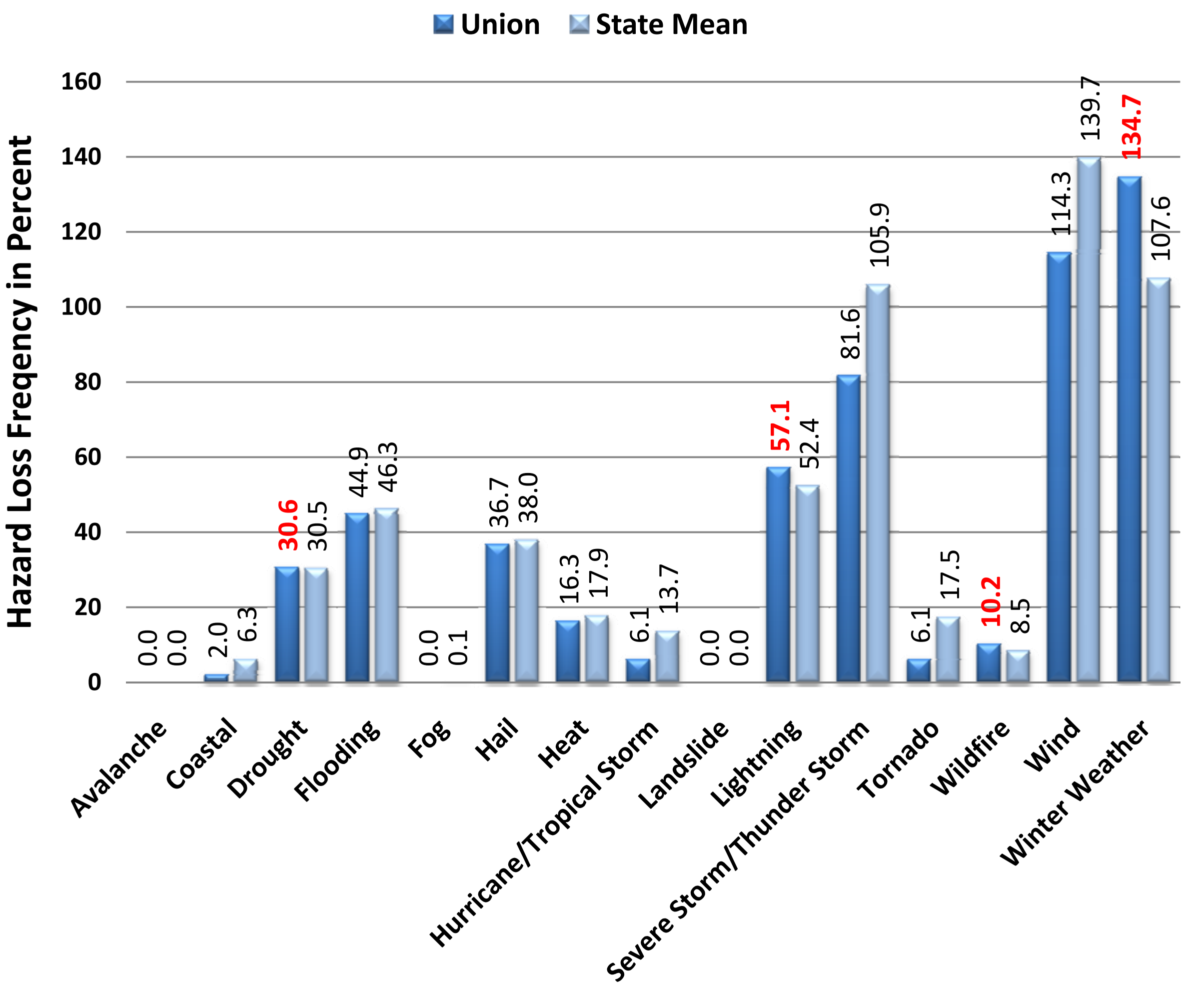


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Union County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Union County exceed $63 million, and are largely due to winter weather, followed by drought and heat. Winter weather represented 50% of the damage in Union County. While significant for the county, these cumulative losses represent less than one percent of the state's overall total.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$2,071,651	1.34%
Hail	$699,121	0.68%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$329,868	0.01%
Lightning	$722,735	1.38%
Severe Storm/ Thunder Storm	$1,050,219	0.50%
Tornado	$464,683	0.20%
Wildfire	$347,075	2.17%
Wind	$826,588	0.57%
Winter Weather	$31,878,232	3.54%
Union - Total	**$63,741,768**	**0.67%**

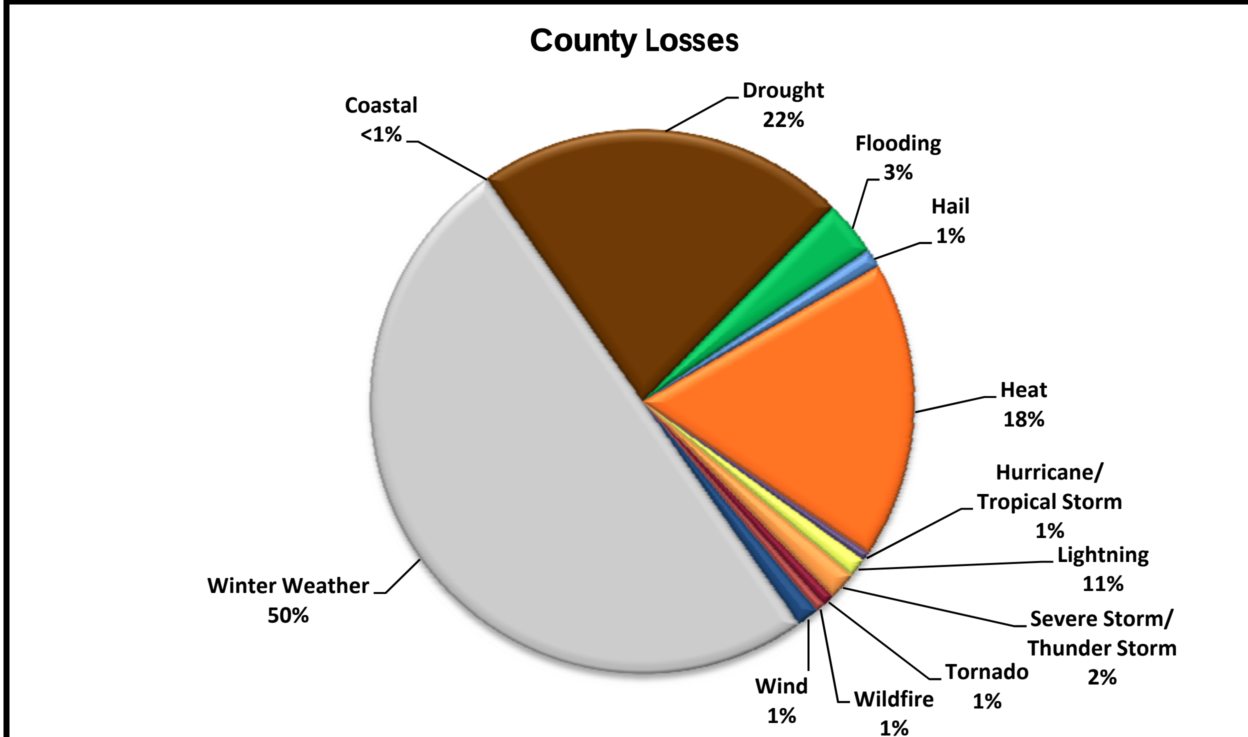
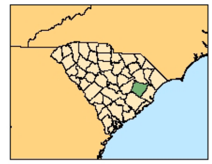


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Union County, SC.

WILLIAMSBURG COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

Williamsburg County is vulnerable to both natural (hurricanes/tropical storm) and technological (hazardous material incidents). Hurricane/tropical storms produce the most monetary damage; however the recurrence interval is 8.3 years, making it a relatively infrequent event. Chronic hazards such as drought that have a shorter recurrence interval (7.4 years) should be carefully monitored. Wildfires, thunderstorms, and hazardous material incidents are some of the prominent hazards that regularly affect the county based on past occurrences, yet result in lower damage totals.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within Williamsburg County, most of the census tracts exhibit moderately high levels of social vulnerability. Census tracts in the north central and eastern parts of the county show limited SoVI scores. Figure 1 provides maps of the Williamsburg County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

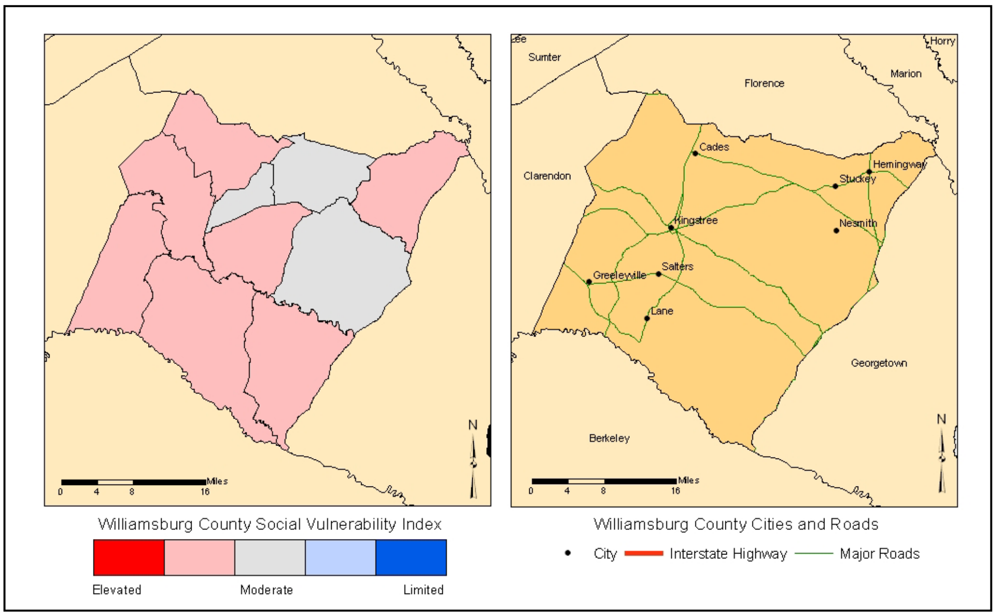


FIGURE 1. The Social Vulnerability for Williamsburg County, SC by US Census tracts and a general reference map of Williamsburg County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
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Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

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IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in Williamsburg County are hazardous material accidents, severe thunderstorms and wind, and wildfires, events that occur more than once per year. Drought, flooding, winter weather, and hurricane winds are hazards are less frequent with less than a 12% chance of occurring in any given year. There were no earthquake or terrorist events in the county. The recurrence and hazard frequency table is in Table 1.

TABLE 1. The Hazard Profile for Williamsburg County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	19	158	8.32	12.03
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	8	59	7.37	13.56
Flood	5	59	11.8	8.47
Fog	0	12	*	*
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	0	310	*	*
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	32	22	0.69	145.45**
Nuclear Power Plant	-	-	-	-
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	6,136	10	<0.50	61,360.00**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	56	59	1.05	94.92
Heavy Precipitation	3	15	5.00	20.00
Lightning	3	16	5.33	18.75
Thunderstorm & Wind	71	59	0.83	120.37**
Tornado	13	59	4.54	22.03
Temperature Extremes	0	16	*	*
Wildfire	6,488	21	<0.50	30,895.24**
Winter Weather (Snow & Ice)	6	59	9.83	10.17

[a] Data Sources: National Climatic Data Center (**www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm**); National Geophysical Data Center (**www.ngdc.noaa.gov/hazard/**)
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
- Data Unavailable

V. Hazard Loss Information

Williamsburg County has a higher probability of hurricane/tropical storms, than the statewide average, and is just above the state average for drought. Figure 2 (page 3) shows those hazards occurring in the county that exceeded the state mean in red font. Winter weather, wind, and thunderstorms are well below the state mean indicating that this hazard historically has had less impact on Williamsburg County than elsewhere in South Carolina.

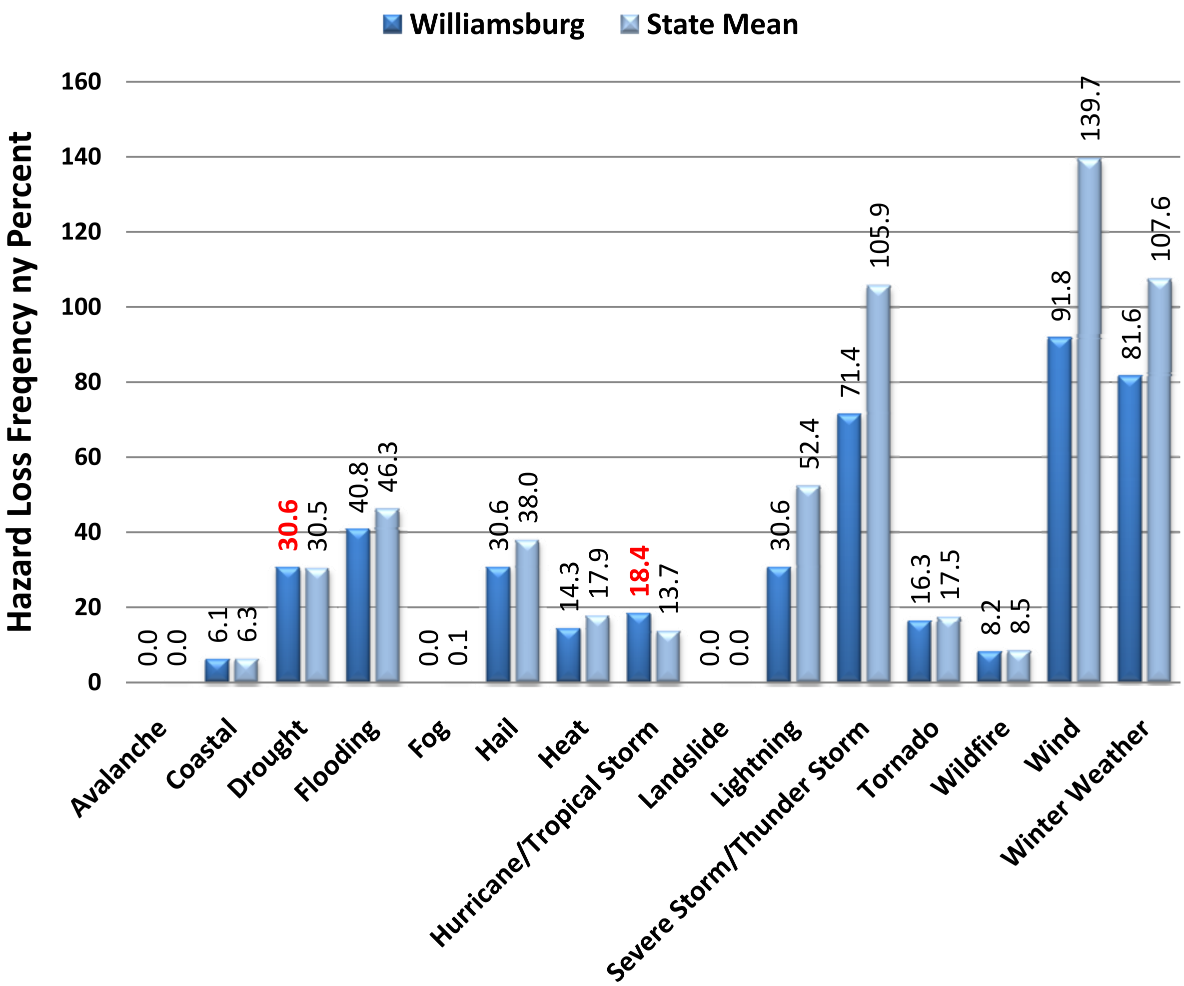


FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for Williamsburg County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in Williamsburg County exceed $228 million, and were largely due to hurricanes and tropical storms, followed by winter weather, and drought, and heat. Hurricane/tropical storm represented 78% of the damage in Williamsburg County. Heat and drought contributed to 11% of the county's losses, primarily in crop losses, while winter weather added 8% to the total (primarily in property damage).

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$295,699	0.03%
Drought	$14,058,406	2.26%
Flooding	$1,373,485	0.92%
Hail	$499,804	0.50%
Heat	$11,286,592	2.26%
Hurricane/ Tropical Storm	$174,657,914	3.30%
Lightning	$172,087	0.34%
Severe Storm/ Thunder Storm	$1,303,544	0.64%
Tornado	$1,760,374	0.76%
Wildfire	$334,040	2.18%
Wind	$1,217,888	0.86%
Winter Weather	$18,869,502	2.09%
Williamsburg - Total	**$228,829,335**	**2.45%**

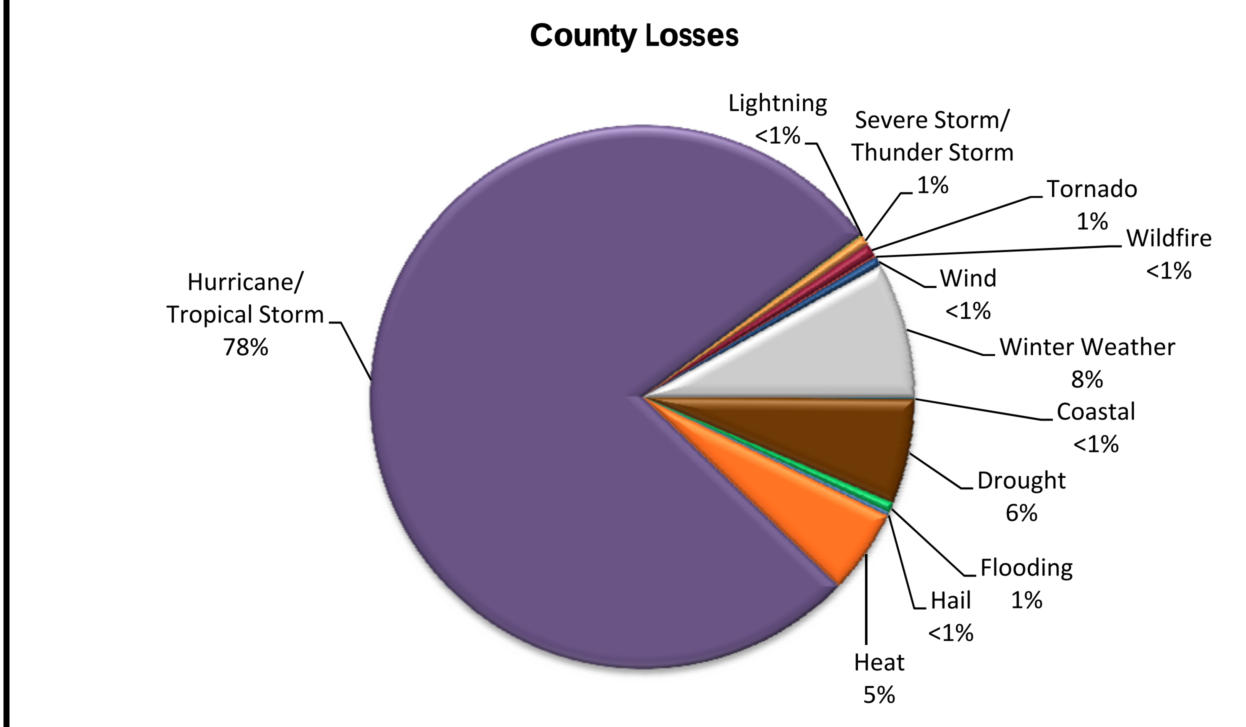
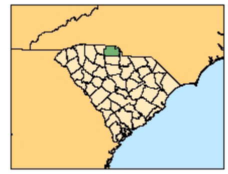


FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for Williamsburg County, SC.

YORK COUNTY, SC

Hazard Profile for 2008

An Excerpt from the State of South Carolina Hazard Assessment for 2008



I. Summary

York County is vulnerable to both natural (hurricanes/tropical storms) and technological (hazardous material incidents) hazards. Hurricane/tropical storms produce the greatest monetary damage; however, the recurrence interval is 22.6 years, making it a relatively rare event. Wildfires, thunderstorms, hail, lightning, and hazardous material incidents are some of the prominent hazards that regularly affect the county, based on past occurrences.

II. Social Vulnerability

Social vulnerability examines the socioeconomic and demographic character of places and helps to explain the variation in the population's ability to prepare for and respond to hazards. The Social Vulnerability Index (SoVI) is a statistical measure that compares social vulnerability to environmental hazards among places, and then visually displays these comparisons on a map. SoVI thus illustrates where there is uneven capacity for preparedness and response and where additional planning and response resources might be used most effectively to help residents. The variables used in determining the Social Vulnerability (SoVI) score along with how SoVI is calculated are available on the Hazards and Vulnerability Research Institute SoVI website (http://www.sovius.org).

Within York County, most of the census tracts exhibit moderate to limited levels of social vulnerability. The exceptions are central Rock Hill and portions of York city. Figure 1 provides maps of the York County depicting (on the left) social vulnerability by census tract and (on the right) cities and major roads.

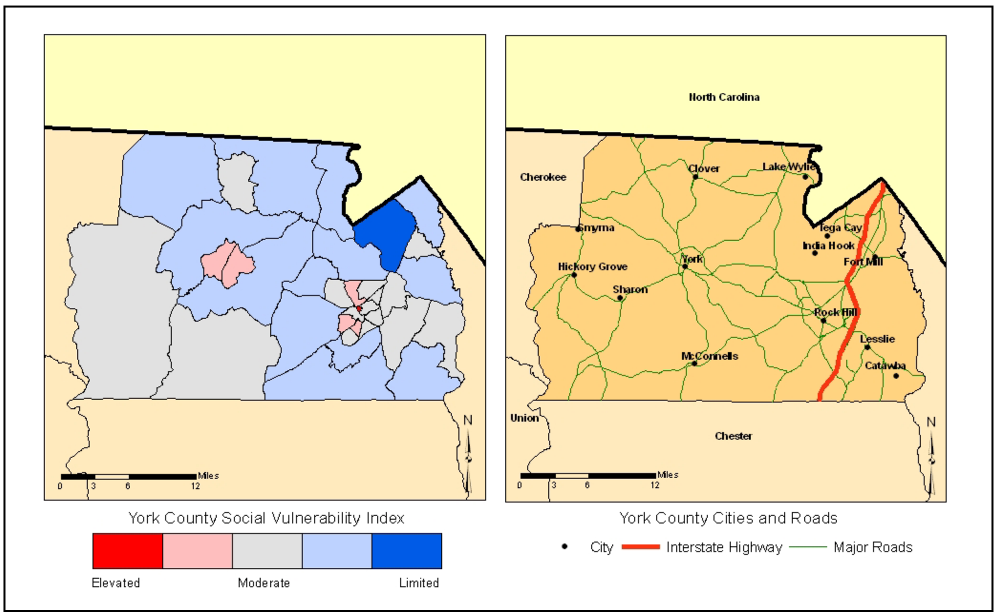


FIGURE 1. The Social Vulnerability for York County, SC by US Census tracts and a general reference map of York County.

III. Terms

Disaster – a singular hazard event that results in widespread human losses or has profound impacts on local environments.
Frequency – a calculated number showing the chance of an event occurring each year based on the historic record.
Hazard – the potential threat to humans as well as the impact of an event on society and the environment.
Recurrence – a calculated number that examines the expected time interval between events based on the historic record.
Risk – the likelihood or probability of occurrence of a hazard or adverse event.
Vulnerability – the potential for loss or the capacity to suffer harm from a hazard event.

South Carolina Emergency Management Division -
Mitigation Division
E-mail: mberry@emd.sc.gov
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Hazard & Vulnerability Research Institute
University of South Carolina
E-mail: scutter.sc.edu
http://webra.cas.sc.edu/hvri

IV. Hazard Identification

The estimated recurrence of a hazard is a useful element (based on event frequency) for distinguishing between infrequent hazards like earthquakes, and frequent hazards such as hazardous materials incidents or traffic accidents. The most common hazard events in York County are wildfires, hazardous material accidents, severe thunderstorms and wind, hail, and lightning. Earthquakes and hurricanes/tropical storms are hazards with the lowest recurrence intervals. The recurrence and hazard frequency table can be seen in Table 1.

TABLE 1. The Hazard Profile for York County, SC.

Hazard[a]	Number of Events	Years in Record	Recurrence Interval (Years)	Hazard Frequency (Percent Chance per Year)
Coastal Events				
Hurricane/Tropical Storm	7	158	22.57	4.43
Ocean & Lake Surf[b]	1	16	16.00	6.25
Waterspout	0	16	*	*
Dam Failure	-	-	-	-
Drought	31	59	1.90	52.54
Flood	17	59	3.47	28.81
Fog	3	12	4.00	25.00
Geophysical Events				
Avalanche	0	49	*	*
Earthquake	1	310	310.00	0.32
Landslide	0	49	*	*
Human-Induced Events				
Civil Disturbance	-	-	-	-
Hazardous Materials (Hazmat)	358	22	<0.50	1,627.27**
Nuclear Power Plant	0	8	*	*
Terrorism	0	29	*	*
Transportation (Motor Vehicle)	38,398	10	<0.50	383,980.00**
Severe Thunderstorm Events				
Funnel Cloud	0	16	*	*
Hail	95	59	0.62	161.02**
Heavy Precipitation	5	15	3.00	33.33
Lightning	21	16	0.76	131.25**
Thunderstorm & Wind	189	59	<0.50	320.34**
Tornado	18	59	3.28	30.51
Temperature Extremes	5	16	3.20	31.25
Wildfire	889	21	<0.50	4,233.33**
Winter Weather (Snow & Ice)	31	59	1.90	52.54

[a] Data Sources: National Climatic Data Center (www.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwEvent~Storm); National Geophysical Data Center (www.ngdc.noaa.gov/hazard/
[b] Includes coastal flooding, coastal erosion, coastal winds

* Unable to calculate (cannot divide by zero)
** Percent is greater than 100.00, therefore hazard can be expected to occur more than once per year
- Data Unavailable

V. Hazard Loss Information

When compared to South Carolina as a whole, York County has a higher probability of loss-producing wind, lightning, thunderstorm, winter weather, and wildfire events. The country is slightly above the state average for drought, flooding, hail, and tornadoes. This comparison between the county and state in Figure 2 (page 3) shows hazards that exceeded the state mean in red type. The remaining hazards are below the state mean indicating that these hazards have historically produced fewer losses for the county when compared to the state as a whole.

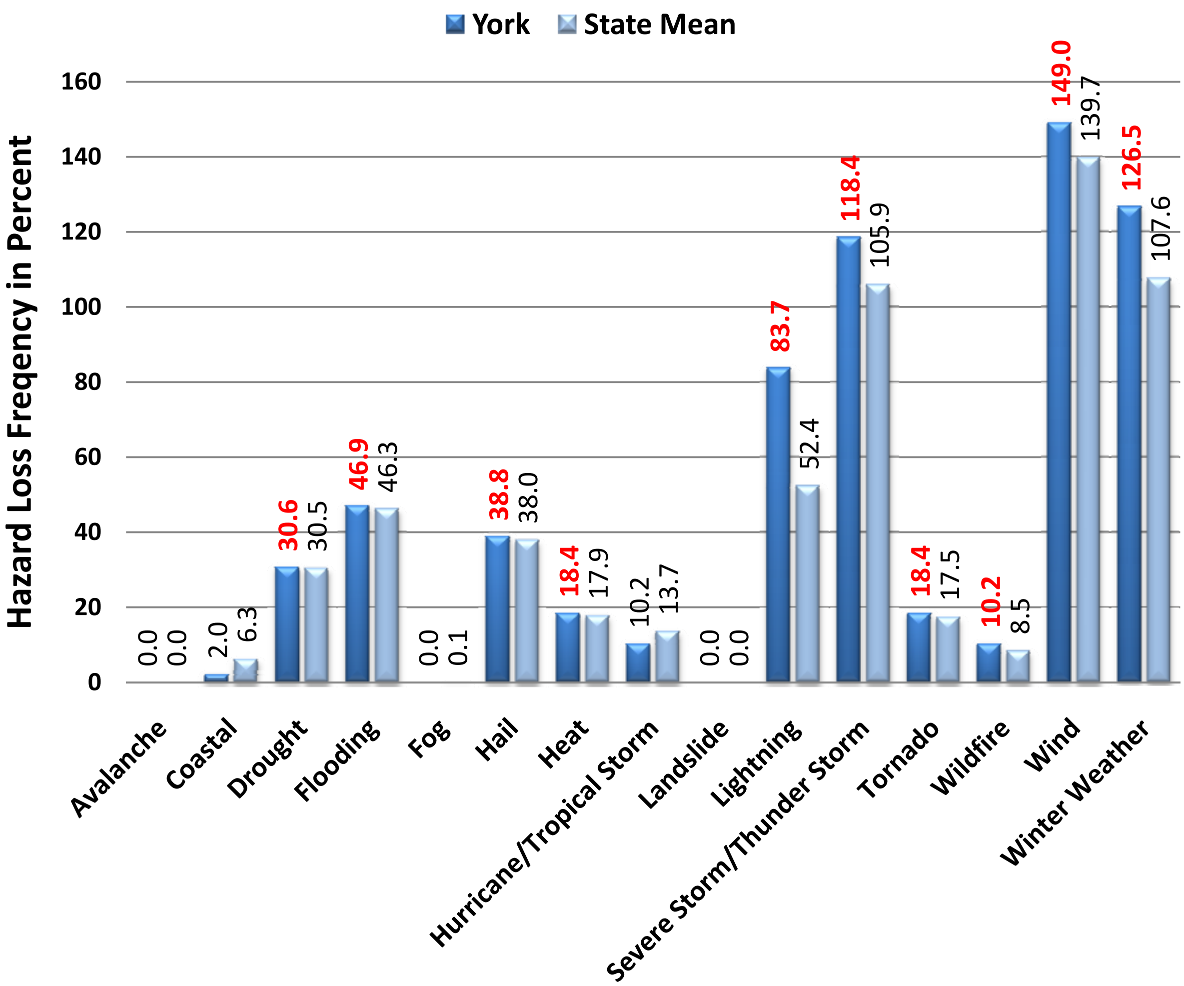

FIGURE 2. The historic loss causing hazard frequency between 1960 and 2008 for York County compared to South Carolina as reported in SHELDUS. Percentage numbers indicated in red are when the county total exceeds the state mean. Also, a hazard that is identified in the National Climatic Data Center Storm Data reports as a multiple event hazard (flooding, winter weather, coastal storm), and given a statewide or regional location, the impact of the event is equally distributed amongst the counties involved.

Another way of determining how vulnerable a county is to particular hazards is by examining the amount of damage caused by past events. In Figure 3 (page 4), the cumulative amount of damage from 1960 to 2008 based on twelve hazard types is computed from the Hazards and Vulnerability Research Institute's SHELDUS database (available at http://www.sheldus.org). The historic losses in York County exceed $168 million, and are largely due to hurricanes and tropical storms, followed by winter weather. Hurricane/tropical storm represented 57% of the damage in York County. While significant for the county, these cumulative losses represent 1.8 % of the state's overall total.

Hazard	Total Damage (in 2008 dollars)	Percent of State
Coastal	$6,476	0.01%
Drought	$14,058,478	2.17%
Flooding	$1,880,410	1.21%
Hail	$6,507,212	6.31%
Heat	$11,286,643	2.17%
Hurricane/ Tropical Storm	$95,668,903	1.74%
Lightning	$985,859	1.88%
Severe Storm/ Thunder Storm	$1,457,933	0.69%
Tornado	$913,524	0.39%
Wildfire	$347,075	2.17%
Wind	$7,054,379	4.84%
Winter Weather	$28,608,386	3.18%
York - Total	**$168,775,279**	**1.76%**

County Losses

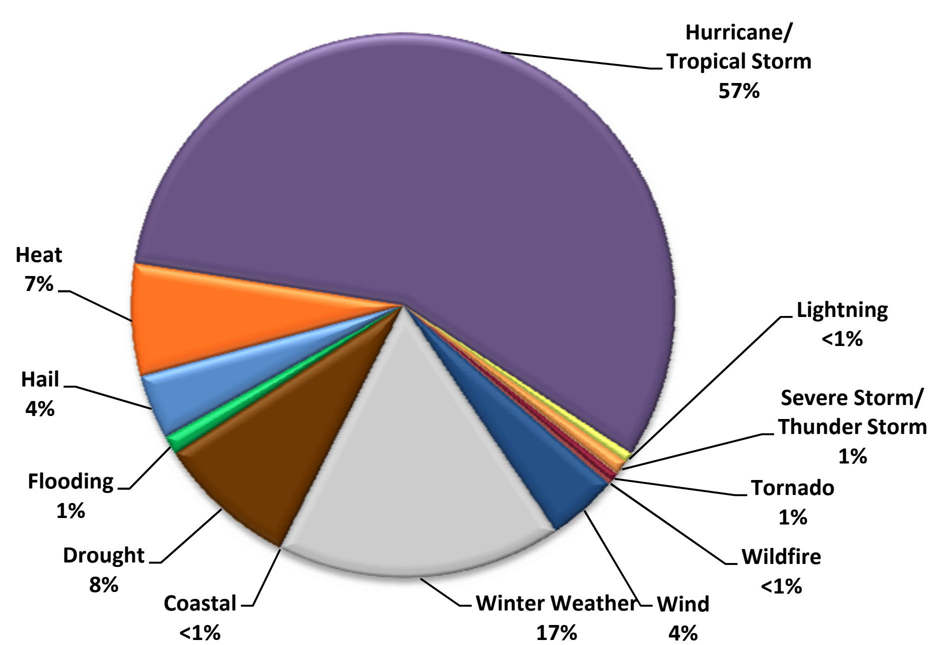

FIGURE 3. Historic Hazard Event Damages (property and crop) between 1960 and 2008 for York County, SC.